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Termination of U.S. Navy procurement contracts for secondary items in long supply

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THESIS

TERMINATION OF U.S. NAVY PROCUREMENT CONTRACTS
FOR SECONDARY ITEMS IN LONG SUPPLY

by

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June 1988

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Termination of U.S. Navy Procurement Contracts For Secondary Items In Long Supply

by

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ABSTRACT

This thesis discusses the U.S. Navy's current situation with regard to secondary items in long supply. This study concentrated solely on the area of acquisition of secondary items for wholesale inventory requirements. A brief history follows of how the U.S. Navy makes its requirements determinations and how the Navy has ended up in a long supply position on many items. The proposed Naval Supply Systems Command's termination model is examined in detail. Recommendations are given for potential improvements in this model which should result in more accurate determinations of the actual costs involved in a termination decision. An alternative decision model is proposed which, if implemented in the Navy, will assist both item managers and buyers in making the best business decisions on whether to terminate a contract for items in long supply or allow it to continue to completion.

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I. INTRODUCTION

A. RESEARCH OBJECTIVES

The Federal government, in order to keep its various agencies and departments operational, is constantly ordering material for its use. Regardless of how carefully the requirements for these items were originally determined, frequently there arises a need to revise requirement quantities either upward or downward. The reason that items are no longer required could be circumstances such as the ending of a war, obsolescence, or items being returned from operating units due to equipment modifications or deletions.

Depending upon the length of time since the original requirement was determined, the purchase request for the items no longer needed could be somewhere in administrative channels or already under contract. Those items which are under contract are, by definition, said to be in "long supply." For a long supply situation, it would be of great use to both the buyer and the item manager (IM) if there were a mechanism available to help them choose between continuing the procurement action(s) and conducting some form of termination process on the procurement action(s).

When should the U.S. Navy terminate procurement contracts for secondary items which are in long supply? The Department

of Defense (DOD) presently has no specific guidance on when, or even if, such contracts should be terminated. Even the term "long supply"[1] has taken on several different meanings in the past few years. If DOD has yet to issue an instruction specifically addressing this issue, and, even more important, if "long supply" has yet to be uniformly defined, is an item being in "long supply" really a problem or just a passing fancy of various auditors?

Both the General Accounting Office (GAO) [Ref. 1] and the Department of Defense Inspector General (DODIG) have been critical of the various DOD Components with regards to their failure to terminate contracts for secondary items which the auditors believed were in excess of the Components' current requirements. Due to the recent period of adverse publicity concerning spare part (secondary items) prices, the DOD Components appear to be quite concerned about potential adverse publicity that could result from buying "too many" secondary items. The most recently published report on this topic area was conducted by the GAO on the Navy and was released January 6, 1988 [Ref. 1]. In this report, GAO had adverse comments about the Navy's failure to comply strictly with economic order quantities (EOQ).

The key problems appear to be two-fold. One problem is that of cost control. In the current era of financial belt-

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[1]A glossary of the various technical terms used but perhaps not fully explained in the text of this thesis is provided as Appendix A.

tightening that DOD is facing, if partial or complete termination is indicated, how are the previously obligated funds recouped? How can the Navy Stock Fund (NSF) operate properly as a "revolving fund" if its dollars are tied up in items in long supply or even in partially completed items and/or raw material which comprises the termination inventory? What should be done if it would cost nearly the same to terminate the contract as it would to complete the contract?

The second type of problem is one concerning the requirement determination process. How are requirement determinations conducted by the U.S. Navy such that items in long supply are ordered or kept on order? What process is used to determine which contract, if any, should be terminated? If an item is determined to be in excess, which stock points should maintain the item? Should the disposal system be used to eliminate the remainder? What report should be the basis for a termination decision? How is the item manager (IM) evaluated concerning his/her percentage or dollar amount of items in long supply? What incentives exist for the IM and the contractor as far as terminations for convenience go? How does the Productive Unit Resourcing System (PURS) account for the effort expended in terminating the purchase request or contract?

B. RESEARCH QUESTIONS

The primary question, which was the focus for this research is:

> Should the U.S. Navy terminate secondary item contracts considered to be in excess of current requirements?

From this basic question, five subsidiary questions were developed:

1. How are items determined to be in excess of requirements by Navy Ships Parts Control Center (SPCC)?
2. What is the decision-making process leading to a termination for the convenience of the Government of secondary item contracts?
3. What is the potential impact of the draft DOD Instruction (Appendix B) regarding secondary items no longer needed on the Navy's wholesale inventory operating procedures?
4. What is the requirements process and how can it lead to the placement of contracts for items in excess of requirements?
5. What are the principal elements of a model which produces an optimum decision[2] regarding contract termination for items in excess of requirements?

C. SCOPE AND ASSUMPTIONS

This research concentrates solely on the area of acquisition of secondary items for wholesale inventory requirements. The Navy's major Inventory Control Points (ICPs), which are responsible for properly managing the wholesale inventory, are Navy Ships Parts Control Center

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[2]The optimum decision in this case is that which minimizes total dollars invested in inventory while not adversely affecting the System Material Availability (SMA) rate.

(SPCC) and Aviation Supply Office (ASO). The focus of the research is principally on SPCC, but implications could be used at ASO for similar situations. The scope of this research effort was limited to SPCC-managed secondary items. Since only secondary items were to be reviewed, no contracts for services or for research and development were included. Procurement contracts with both large and small firms were reviewed.

D. RESEARCH METHODOLOGY

The primary research methodology employed was an extensive review of relevant literature. This review was conducted both to obtain a historical picture of how DOD got into its present situation regarding long supply and to look at the various techniques the different Services use to minimize their items in long supply. Sources used included; the Dudley Knox Library at the Naval Postgraduate School, the Defense Logistics Studies Information Exchange (DLSIE), Federal Legal Information Through Electronics (FLITE), and the Defense Systems Management College publications. Various current professional and trade publications were helpful in identifying the current trends and technology that might be used at SPCC. These useful sources of information are contained in the List of References section of this thesis.

The secondary research methodology employed was a combination of personal and telephone interviews. In order to develop a better personal understanding of what the

current situation actually was, a short fact finding trip was taken to the Naval Supply Systems Command (NAVSUP) and SPCC. This trip was enlightening in regards to problem areas not normally discussed in written articles, as well as how individual divisions both within SPCC and between SPCC and NAVSUP interact. This trip formed the basis for the recommendations and conclusions of Chapter VIII.

In-depth discussions were held with various members of the program support office of the Weapons Systems Support Group (SPCC 05 Staff) as well as the IMs' actual superiors. No actual interviews were conducted with the individual IMs. Interviews were conducted with both procuring contracting officers (PCOs) and termination contracting officers (TCOs). The interviews with the PCOs were conducted in person at SPCC while those with the TCOs were conducted via telephone with personnel at two of the nine Defense Contract Administration Service Regions (DCASRs).

The information obtained from these methods was analyzed, compared, and contrasted in order to obtain a clearer picture of what the various forces, effects and considerations were relevant to the problem of deciding which secondary item contracts should be terminated if in long supply.

E. ORGANIZATION

Chapter II gives the background of how the problem of items in long supply has grown to its present dollar amount and current high level of interest.

Chapter III describes the basic requirements determination process, basic inventory theory, the assumptions upon which the EOQ model is based, and some of the peculiarities inherent in the Navy's Uniform Inventory Control Program (UICP).

Chapter IV discusses when and how terminations for the convenience of the Government came into being, and what restrictions have been placed upon its use by case law.

Chapter V looks at the various costs which should be considered in an effective cost-benefit analysis used to determine whether to terminate a contract for the item in long supply.

Chapter VI discusses the initiatives which were begun by both NAVSUP and SPCC to better control both the termination decision and the requirements procedure.

Chapter VII presents the decision model for actions to be taken when an item, having open procurement actions, is determined to be in excess of requirements. This chapter also contains the justification for the selection of various values for the parameters used in the model. A comparison is also made between the model developed in this chapter and SPCC's current termination procedures.

Chapter VIII is a summary of the findings and conclusions along with proposed recommendations and areas for future research.

II. BACKGROUND

A. A PROBLEM IN EXISTENCE FOR MANY YEARS

The need for the Armed Services to terminate a contract for items which are in long supply is not a recent phenomenon. Since the Civil War, this situation has normally occurred as a war was coming to an end. After the Armed Services Procurement Regulation (ASPR) was issued in 1947, the area of concern with regard to excess material has been the lack of aggressive cancellations of contracts for items in long supply. The GAO, serving as Congress' "watchdog" on the nation's purse, has repeatedly criticized the Services for their lack of aggressive cancellations.

The first such published report found during the literature search was one concerning Air Force spare parts procurement for the period of 1956 to 1957. This report found: [Ref. 2:p. i]

> ...that large quantities of aircraft parts on order in excess of needs were not canceled because satisfactory controls had not been established to assure timely cancellation action when requirements were reduced....only a small portion of the excesses on contract had been canceled prior to our review, although program changes and other factors had caused many of these items to become excess 7 or 8 months earlier.

What was believed to have triggered the excesses was a major reduction in the flying hour program for fiscal year

1957. The reason excesses occurred was the management at the activity: [Ref. 2:p. 3]

> ...had not established satisfactory controls to assure that, when requirements were reduced, timely reviews would be made of outstanding orders for supplies and that unneeded quantities on order would be promptly canceled.

The dollar amounts involved, although small by today's standards, were quite large for the time. GAO stated that their review showed the activity had, "in excess of current program needs, over $20,000,000 worth of spare parts on hand and about $20,000,000 more on order." [Ref. 2:p. i]

GAO recommended that the following changes be made to Air Force supply regulations for the activity: [Ref. 2:pp. 11,12]

1. Quantities on order which are excess to termination levels be considered for termination action immediately after requirements are computed and that excesses which have been delivered to the Air Force be considered promptly for return to contractors as Government-furnished equipment for use in the production of aircraft or engines, with appropriate adjustments in contract prices.

2. A report be prepared for all excess Hi-Valu (sic) items, by property class, as soon as consideration has been given to these items in the computation of requirements (a) indicating the actions initiated and (b) appropriately explaining items on which no termination or return to contractor has been initiated, and that this report be reviewed and evaluated by the Director of Supply and Services or his designated representative.

3. A register and follow-up system be maintained in each prime property class unit in order to control the states of Hi-Valu (sic) items for which termination or return to the contractor has been initiated and that each prime property class unit make a periodic report to the Director of Supply and Services regarding its progress in reducing quantities of excess Hi-Valu (sic) items.

4. The Requirements Analysis Branch review the status of excess items and compliance with Air Force regulations for reducing excesses.

The Air Force reported that it had implemented all the recommendations and that a "30-day limit has been set for terminating orders or offering delivered spare parts to contractors after reduced requirements are computed." [Ref. 2:p. 12]

During the same basic time period as the case above, GAO also provided statistics for fiscal years 1954, 1955, and 1956 relating to contracts terminated for the convenience of the Government by the Armed Services. [Ref. 3] This GAO report summarized statistics on 12,535 contracts terminated by the Government and 12,979 settlements (either negotiated or unilaterally determined dollar amounts awarded the contractor in place of the original contract dollar value) effected during fiscal years 1954, 1955, and 1956. The report stated: [Ref. 3:p. 7]

> During the period January 1, 1954, through April 30, 1956, the Department of the Navy terminated, for the convenience of the Government, 2,060 contracts having a total CPIT (Contract Price of Items Terminated) of $1,297,745,656.

Table 2-1 on the following page summarizes the Navy's terminations, settlements, and number of unsettled terminations as of April 30, 1956.

Of the total contracts terminated by the Navy, as reported in the 1957 GAO report [Ref. 3], 16.6% had Contract Price of Items Terminated (CPITs) of $100,000 and over. This

TABLE 2-1--NAVY CONTRACT STATUS [Ref. 3:p.8]

	Number	CPIT (in millions)
Unsettled terminations, January 1, 1954	920	$1,855.0
Add terminations:		
Jan. 1 to Jun. 30, 1954	436	495.2
Jul. 1, 1954 to Jun. 30, 1955	809	613.9
Jul. 1, 1955 to Apr. 30, 1956	815	188.6
Total terminations	2,060	1,297.7
Deduct settlements:		
Jan. 1 to Jun. 30, 1954	422	278.2
Jul. 1, 1954 to Jun. 30, 1955	773	587.8
Jul. 1, 1955 to Apr. 30, 1956	979	513.7
Total settlements	2,174	1,379.7
Revisions in CPIT from Jan. 1, 1954, to Apr. 30, 1956, net increase	---	52.0
Unsettled terminations, Apr. 30, 1956	806	$1,825.0

16.6% of the total number accounted for 93.7% of the total dollar value of contracts terminated. Of interest, 83.7% of the number and 42.6% of the dollar value were in fixed-price contracts. These figures would be much lower today. 14% of the number and 7.9% of the dollar value were in CPFF (cost plus fixed fee) contracts, which are no longer used. 2.2% of the number and 49.5% of the dollar value were in letter contracts. The letter contract dollar value percentage has decreased considerably in recent years. [Ref. 3:p.9]

During the 1954 to 1956 period, the Armed Services Procurement Regulation (ASPR) allowed the contractor a period of two years in which to submit his settlement proposal for contracts terminated by the Government. This period could be extended from time to time with the approval of the contracting officer. As is true today, the two years in some cases was just a starting point due to delays resulting from disputes or claims being considered by the Armed Services Board of Contract Appeal (ASBCA) or the courts. This is vividly demonstrated in GAO's report when "at December 31, 1956, 56 of these terminations, with a CPIT of $719,585,343, still remained unsettled and at that date had been in process of settlement for periods ranging from 33 to 63 months." [Ref. 3:p. 10]

In the next ten years, the GAO issued six separate reports "disclosing unnecessary costs incurred with (sic) the DOD because excess procurements were not canceled or

reduced." [Ref. 4:pp. 32,33] The basic problem that GAO reported was that in none of the cases they reviewed was there any comparison done of the costs to hold versus the cost to cancel.

In the specific case of excess missile spare parts, GAO reported that $154,000 in costs were incurred due to the IM failing to cancel purchase requests prior to contract award when the request was known to exceed the requirements objective. [Ref. 4:p. 5]

After the Army complained that the GAO had not carefully reviewed all the applicable regulations, and specifically an internal memorandum of September 4, 1964, entitled "Cancellation of Procurement Requests," GAO stated: [Ref. 4:p. 15]

> In our opinion, however, the procedures contained in the September 1964 memorandum were deficient in that (1) they provided that the contracting officer, rather than the supply commodity manager, was responsible for deciding whether termination of excessive procurement was more economical than accepting delivery of excess parts and (2) they contained no provision for furnishing the contracting officer with the necessary information pertaining to the costs of holding excessive stock on hand.

In this case also, the Army first states what has been heard numerous times since then: [Ref. 4:p. 29]

> Initial procurements were based on anticipated consumption rates (engineering estimates). Subsequent to these buys, there were reductions in the major item densities, stockage allowances, and/or estimated maintenance rates, which in turn caused items to become excess to procurement levels but not necessarily excess to authorized stockage levels (the procurement level is just one of approximately ten separate segments which comprise the funded requirements. These funded requirements when combined with certain unfunded requirements constitute the authorized stockage

level of an item.). Various attempts were made toward cancellation of the requirement; however, the bulk of the requirements were under contract and not terminated because of high cancellation costs and the expectation that material would be required at a later date.

The next eight years or so were relatively quiet as far as GAO reports concerning the Armed Services and inventory problems. On September 12, 1972, GAO published "Need to Improve Accuracy of Air Force Requirements System for Repairable Parts." In that report, GAO stated that the causes of inaccurate data and adjustments were: [Ref. 5:p. 36]

1. Data not being checked for accuracy before being used due to manager's heavy workload.
2. Good information sources not being readily available for some of the needed data.
3. Policies and procedures being ambiguous and unclear.
4. Personnel not being trained thoroughly in the system's operations.

The next ten years yielded 15 more GAO reports on inventory-related issues [Ref. 6:p. 27]. In November 1981, GAO made a review to check the validity of the various Services' requirements determination processes. They also looked at the various techniques in use to see if "cross pollination" would help the different branches better use their finite resources.

Unfortunately, GAO found little consistency and coordination between the services on methods to determine requirements. The problem areas GAO had reported on in 1972 were still present in 1981. Additionally, GAO found fault

with: the lack of uniformity in what the various lead times encompassed, and how they were determined; how inaccuracies in the system appeared to be the rule; and the reasons each Service insisted on using a different forecasting technique. [Ref. 5:pp. ii-v]

One of the recommendations that the GAO mentioned was for DOD to: [Ref. 5:p. v]

- Issue guidance to the services which specifically states
  (1) when a production lead time should be terminated[3], and
  (2) how lead time requirements should be determined for items requiring first article testing.

Based upon this recommendation and a June 1983 GAO report, DOD authorized a study to be conducted by the Logistics Systems Analysis Office with the objectives of reviewing current practices both of DOD and selected contractors and then developing standard criteria for the "determination of realistic procurement lead times for secondary items." [Ref. 7:p. 2]

The Logistics Systems Analysis Office completed their study and reported their findings in March 1984 [Ref. 7]. The results of their study were incorporated into DOD Instruction 4140.55, "Procurement Lead Times for Secondary

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[3]The researcher believes that what GAO meant by this statement was that when contracts were awarded with a delivery schedule which encompassed a long period of time, uniformity between the Services was needed. One Service would include the time from contract award until the last unit was delivered while another Service would only include the time from contract award to the first unit being delivered, thus resulting in a major difference being reported in the length of time involved.

Items" dated December 9, 1985 [Ref. 8]. This area will be discussed in further detail in the procurement lead time (PCLT) section of this chapter.

In 1982, the GAO reiterated their opinion stated in 1974 that "many aircraft operational readiness problems were caused by unexpected parts failures, late repairs of parts, and modification or updating of parts, rather than a lack of sufficient funds." [Ref. 6:p. 1] In the report once again lead time delays, in this case production lead time delays, were mentioned as a cause of item criticality. The Air Force item managers attempted to compensate for this delay by not cancelling contracts which presently were in long supply but potentially could be used in the future.

An October 15, 1982 GAO report [Ref. 9] identified an additional manner in which items came into long supply. This report pointed out failure of communications as the cause for items becoming long supply. One such failure of communications was found within the Air Force system. Another was a failure by the Air Force to notify DLA of planned modifications and changes to material requirements. As the report stated: [Ref. 9:p. i]

> When Defense-managed items are being removed or replaced (during planned modifications and/or equipment changes), it is important for managers (DLA item managers) to be alerted so that proper decisions can be made to purchase and repair only those items needed through the completion of the modification program.

This failure of communications was further demonstrated in GAO's January 10, 1984 report on DLA inventories [Ref.

10]. In this report, GAO found that DLA IMs did not adequately consider other Services' procurement actions prior to ordering for the first time. Additionally, GAO stated that the criteria used by DLA IMs to determine whether to terminate or not allowed for excessive buffer stocks. [Ref. 10:p. 1] This report was the first in which GAO mentioned some of the legitimate reasons for a Service to purposely over-order an item. These included:

1. valid known requirements were excluded from the requirements computation,
2. different criteria existed for asset application in stratification decisions and supply control decisions, resulting in different supply positions, and
3. the items were obtainable only from Diminishing Manufacturing Sources (DMSMS).

In GAO's sample of 100 items, 45 items totaling $1.4 million were erroneously reported as overprocured for the above three reasons. The remaining 55 items totalling $2.1 million became excessive for the following reasons: [Ref. 10:pp. 7,8]

	% of items	% of dollars
Demand decreased after buy	45.4	67.7
IM overbought on purpose and/or in error	27.3	21.7
Logistics reassignment problem	12.7	5.5
Reduced procurement cycle[4] due to standard price increase	9.1	2.3
Other	5.5	2.8
Total	100	100

The DOD response to this GAO review stated that there were instances in which the administrative and possible termination costs associated with cancelling contractual quantities could result in an inappropriate action being taken. These occurred when: [Ref. 10:p. 16]

1. There is high probability that potential overprocured quantities will be utilized during a future period;
2. The availability of such quantities will negate the need for procurement funds during a future period; and
3. Cancellation of contractual quantities would cause a repetitive purchase action in the ensuing months.[5]

The next report that came out concerning inventory management, shortly after the spares pricing "horror stories"

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[4]The researcher believes the proper term that should be used here is reorder cycle. As the cost of an item increases, the EOQ model recommends a reduced quantity to buy but at a more frequent rate.

[5]As will be discussed in Chapter VI, a major concern in deciding whether to terminate is the expected "churn." Churn in this case refers to the situation in which an item is recommended for termination on one SDR, is terminated, then shortly thereafter is recommended for a buy.

made the front pages, was a DOD Inspector General (DODIG) report on the "Defense-Wide Audit of Procurement of Spare Parts." [Ref. 11] The DODIG found fault with the buyers for failing to purchase spares directly from the actual manufacturer regardless of the lack of sufficient personnel to perform the breakouts[6] required. [Ref. 11:p. 6]

One of the actions that DOD took to increase competition and facilitate breakouts was to revise personnel evaluation factors to look not only at the quantity of purchase actions completed but also to look at the achievement of economical purchases. [Ref. 11:p. 7]

Purchasing of uneconomical quantities was another problem area identified. Specifically: [Ref. 11:p. 9]

1. the procuring activity did not take advantage of price breaks offered by vendors for larger buys of needed items,

2. usage of the item justified less frequent and higher quantity buys than those made (normally mature items with a relatively stable demand history),

3. emphasis was placed on ordering minimum quantities of initial spares although the items' designs were stable and larger purchases could be justified, or

4. more than one stock number was listed for the same part, or a preferred substitute item was available in the Federal Supply System. Combining the requirement for both stock numbers or buying the substitute item would have resulted in lower unit prices.

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[6]Breakout is the term used to describe the process by which parts identified on drawings are traced back to their original manufacturer. By buying the part from the original manufacturer, dollars are saved due to removing layers of companies which do not change the item but add their costs and profits onto the item before selling it to the government.

During the same time frame that DODIG was auditing the Services, GAO was reviewing the Navy's procedures and practices for cancelling procurements of unneeded material [Ref. 12]. Problems that GAO identified included ICPs establishing high dollar review thresholds, providing added buffer stocks, failing to act on termination notices in a timely manner, and establishing only limited supervision throughout the cancellation process. [Ref. 12:p. 1]

In the year of the study, fiscal year 1983, SPCC's UICP initiated 24,429 termination notices valued at about $800 million [Ref. 12:p. 3]. The individual IM, upon receipt of a termination notice, has three choices concerning the recommended termination quantity; (1) approve the quantity, (2) reduce the quantity, or (3) reject the quantity entirely.

GAO found that the cancellation rate was quite low; less than 2% of the dollar value was approved by the IMs for possible cancellation, and less than 1% was actually canceled [Ref. 12:p. 3]. GAO's final estimate was that approximately 8% of the dollar value could have been canceled [Ref. 12:p. 4].

GAO's problem with the review thresholds was that they were not based on an assessment of costs and benefits. Specifically, GAO did not like SPCC "subjectively" setting the review thresholds (the dollar value of the excess material at which the corresponding procurement actions would be reviewed for potential cancellation) in effect May 1983 at

$2,500 for purchase requests, $10,000 for purchase requests under solicitation, and $25,000 for contracts. In November 1983 these amounts were increased to $10,000 for purchase requests and $50,000 for contracts, again with no cost/benefit analysis being conducted [Ref. 12:p. 4]. GAO's reasoning was that the dollar limitations "greatly affect the value of excess material that can be considered for cancellation." [Ref. 12:p. 4] These review thresholds will be discussed in Chapters VI and VII of this thesis.

Of interest is a statement in the GAO report that "(n)otices not rejected within the 5 days are automatically approved by the Uniform Inventory Control Point (UICP) system and forwarded to the purchasing division for possible cancellation." [Ref. 12:p. 6] As each GAO report normally contains a section in which the audited agency is permitted an opportunity to respond, the researcher was surprised when no response to this statement was included in DOD's comments. The reason for this surprise was the researcher's understanding concerning the operation of the UICP system. This understanding was that while the UICP might automatically produce purchase orders for required items, UICP required human intervention to cancel requirements due to the potential losses involved in both time and dollars. This discrepancy, plus the importance of knowing whether UICP did indeed automatically send cancellations to the purchasing

division, presented an item to be resolved during the researcher's thesis travel to SPCC.

During the researcher's thesis travel to SPCC, the question as to how the UICP treated cancellations was brought up several different times. When this question was asked of personnel in the Weapon Systems Support Group (the IMs' bosses), they provided a copy of their instruction titled "Consumable and Depot Level Repairable (DLR) Supply Demand Review (SDR)" [Ref. 13]. This instruction clearly states, "Termination. SDR recommended terminations are normally 'dead,' meaning they must be prepared as adds[7] for the termination to be effective." [Ref. 13:p. 5] The personnel contacted in SPCC's contracting department did not agree with this. The actual contract administrators contacted stated that there were "numerous" instances in which after receiving a termination request, they contacted the appropriate IM to see if indeed a cancellation was required, and the IM stated that this was "the first they had heard of it." This is a current problem which exists at SPCC and most definitely must be resolved in order to achieve the high degree of mutual trust required of all parties in order to rectify the current long supply problem.

The Air Force was the next service to have the GAO review its procedures and practices for terminating procurements of

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[7]"Adds" in this case refers to the addition of the item to the SDR action form.

excess on-order spare parts [Ref. 14]. As the Air Force uses a quarterly computational system (D041), relatively few reviews are done (compared to the Navy's SDR) to determine if reorder points have been reached in a timely fashion, and thus a higher average inventory level is required (the periodic review procedure is discussed in Chapter III). In the Air Force, the IMs review the D041 recommendations and validate its data with facts that they know. Based upon this adjustment and consideration of various costs and factors such as the amount of production lead time (PLT) which has elapsed, the IMs recommend the quantity to be terminated. The IMs' recommendations are then reviewed by their supervisor. Both the IMs' and the supervisor's recommendations are then forwarded to the contracting and manufacturing directorate. Only at this directorate is the final decision on termination made. If this sounds very time intensive, it is. While the Air Force Logistics Command (AFLC) Regulations require that IMs review termination recommendations within 10 work days after receipt, in practice it takes much longer. GAO stated: [Ref. 14:p. 9]

> Of the 19 items at Sacramento, 12 were not reviewed within the required 10 work days. Six of the 12 had been in the material management directorate's review process for more than 60 days, including one item which was under management review for 98 days and another which had been held for 89 days with no action.

A possible reason for the delays in review could be the amount of data errors in the D041 system. The AFLC directed its Air Logistic Centers to validate reported on-order item

excesses that exceeded $1 million from the cycle run March 31, 1986. The review reported that the initial $1,405.9 million value of reported on-order excesses was in fact overstated by $730.2 million, or 51.9%. [Ref. 14:p. 11]

In January 1988, it was the Navy's turn once again to have GAO review its requirements determination process to ensure it was accurately determining what was needed [Ref. 1]. Based upon its review, GAO felt: [Ref. 1:p.2]

> The Navy could reduce the potential for increasing its stocks beyond current needs (long supply) and minimize the costs of ordering and holding inventory by ordering the economic order quantity (EOQ) rather than a 1-year supply.

This GAO report and one other GAO report on DOD inventory management [Ref. 15] were the catalysts for this thesis. GAO reported that for all of DOD, secondary items identified as "excess" had grown almost 200 percent between fiscal years 1981 and 1987. [Ref. 15:p. 9] "In dollar figures, these excesses are valued at $29.5 billion, up from $10.2 billion in 1981." [Ref. 15:p. 9] With figures such as those above, it was logical to research the potential methodology for identifying items truly in long supply and how a reduction of items in long supply might be achieved while simultaneously not adversely affecting major weapon system availablilty.

B. WHY ITEMS IN "EXCESS" OF REQUIREMENTS ARE ON ORDER

Researching various reasons the Services would purposely order or keep on order items in "excess" of known requirements was quite revealing. From the various GAO and

other similar reports discussed in the previous section, the following reasons were mentioned:

1. Support for aging military equipment. When the original equipment manufacturer notifies the user of his intention to stop producing spare parts due to either age or technological advances, the user is forced to decide whether to conduct a Life-of-Type (LOT) buy of the remaining stock, attempt commercialization, or find another source. If, under the Diminishing Manufacturing Sources and Material Shortage (DMSMS) program [Ref. 16], the LOT buy is the chosen route, then items in excess of immediate needs will definitely be ordered. But this type of procurement is a legitimate ordering technique. [Ref. 17:pp. 24-29]

2. Unplanned decreases in projected demands due to: [Ref. 1:p. 16]

   a. program phaseouts,

   b. engineering changes,

   c. flying hour decreases, and

   d. weapon system deployment changes.

3. Modifications to correct deficiencies or to improve capabilities of existing weapons systems and equipment. The problem that arises here is when the engineers plan and execute a modification without informing the appropriate IMs. The IMs continue to order either the old parts or quantities, thus resulting in "excess" spare parts being on order. [Ref. 9:p. 1]

4. COG/responsibility migration. When the originating Service has passed an item to DLA for management and has either failed to keep or to pass the proper records of what they have on contract or under outstanding purchase requests for prior to transfer, problems arise. When DLA looks at the on-hand quantity, they then order what they believe is required. Only when both orders come in is it realized that duplication occurred due to a communications breakdown. [Ref. 9:p. 23]

5. Increases in procurement lead time (PCLT). As either production lead time (PLT) or administrative lead time (ALT) or both increase, a longer time passes between hitting the reorder level and receipt of the item. As

many items display a wide variance in demand, this increased time period creates a potential vulnerability for the IM. Up until the past year, IMs were evaluated primarily on the availability of stock on hand. The natural tendency in a time of increasing PCLT was to order enough stock to carry one through whatever the length of added PCLT. Obviously this reaction resulted in excessive quantities of stock either on hand or on order. In the past year IMs have begun to have included in their evaluation how they handled termination recommendations. This new element in their evaluation should force IMs to balance having "too much" stock on hand with not accepting enough termination recommendations.

6. Different criteria are used between asset application in stratification and supply demand review (SDR). This difference can lead to different recommendations being made at the same time.

7. Reduced reorder cycle due to standard price increases which result in smaller, but more frequent orders. [Ref. 10:p. 7]

8. Material turned into stores (MTIS). This occurs when an operating unit or command realizes that they have material which they no longer need in the quantity they currently have on hand. Since this material is in ready-for-issue (RFI) condition, the items are turned into the nearest supply facility. Only when these items are reported as being received by the transactions reporting activity does the IM know of their existence.

From the above eight examples, it can be seen that semi-legitimate reasons do in fact exist for having items in "excess" of known requirements either remain on order or be ordered. Communications breakdown appears to be a major contributor to several of the above categories. A major factor appears to be the extremely lengthy PCLT and budgetary processes. PCLT will be discussed next while budgetary issues will be discussed in Chapter V.

C. PROCUREMENT LEAD TIME (PCLT)

As was discussed in example five of the above section, increases in procurement lead time (PCLT) have resulted in items being ordered which end up becoming long supply. As PCLT has increased, IMs have used UICPs' forecasting models (which use historical data that has been expotentially smoothed) and/or their own professional knowledge in an attempt to estimate what quantity of an item to haveon-hand at what time in order to fulfill anticipated requirements. Unfortunately, the IMs have not been correct 100% of the time, and thus some items which they ordered have indeed become long supply. This section on PCLT discusses why PCLT has attracted GAO's interest, how PCLT is defined, and what the effects of having incorrect values for PCLT in the UICP does to item availability.

DOD is faced with increasing GAO interest and dissatisfaction with the present trend of increasing PCLT. A major reason for GAO's interest is the dollar value which is involved. Overall, DOD material requirements needed to support demand during PCLT have grown from less than $8 billion in FY79, to an amount in excess of $15 billion in FY83, to more than $20 billion in FY86. In FY83, it was estimated that each day of lead time added $30 million to the budget. As of FY86 this figure had grown to $40 million per day. [Refs. 7:p. 1; 15:p. 9; 18:p. 1-2]

Procurement Lead Time (PCLT) is the sum of Administrative Lead Time (ALT) and Production Lead Time (PLT). If either one or both of the components increase, PCLT will increase as well. Besides the $40-million-per-day increase effect, other negative effects of increased PCLT are: [Ref. 18:p. 1-2]

1. Increased safety levels and larger on-hand inventories,
2. Higher obligational authority to cover inflated procurement pipelines,
3. Longer forecast period and less accurate projection of material requirements,
4. Reduced system flexibility to react to technological, operational, and other demand changes, and
5. Increased likelihood of material shortages or excesses.

An issue GAO raised in a 1981 report [Ref. 5] was the lack of consistency between Services on when exactly ALT and PLT started and ended. Each of the Services was reporting it differently and in what they believed was the correct fashion. GAO's 1981 report, and another GAO report in 1983, prompted DOD to commission a study by the Logistics Systems Analysis Office (LSAO) to determine what secondary item PCLT should actually consist of. LSAO's March 1984 study findings [Ref. 7] provided the basis from which DOD Instruction 4140.55 of December 9, 1985 titled "Procurement Lead Times for Secondary Items" [Ref. 8] was derived.

In order to more uniformly define ALT and PLT, the following was done. In DOD Instruction 4140.24, ALT was referred to as "the time interval between initiation of procurement action and award of contract," PLT was defined as

"the time interval between the placement of a contract and the first significant receipt into the supply system of material purchased as a result of such action." [Ref. 19: Encl. 1 p. 2] These definitions were too ambiguous so DOD Instruction 4140.55 [Ref. 8] restated the definitions more precisely. ALT began when: [Ref. 8:p. 2]

> ...an item's wholesale asset level drops to or below the reorder point, or the time at which a procurement order must be initiated so that stock arrives, theoretically, just as the on-hand asset level reaches the safety level.

ALT was to stop upon "the date the contractual instrument is executed." [Ref. 8:p. 2] Included in ALT were the time periods required for the "identification of the requirement to buy; review, approval and documentation of the purchase request; technical data review and documentation; and the processing and execution of the contractual instrument." [Ref. 8:p. 2]

PLT was to begin upon "the date the contractual instrument is executed," and to end "when receipt of delivery is confirmed by the storage activity to the managing Inventory Control Point (ICP)." [Ref. 8:p. 2] The exact definition of receipt of delivery encompasses one and one-half pages of the instruction as well as an additional page illustrating how it should be computed.

Focusing on ALT at SPCC, there has been a large increase in average ALT. In 1979 ALT was 110 days, of which 59 days involved active processing and 51 days were spent waiting in

queue [Ref. 20:p. 13]. The following chart shows competitively procured items' ALT by the type of buying methodology used. The days figure is the period from the IMs initial purchase action until contract award, as of September 30, 1987. The percentage figures for both consumables and repairables illustrates how the procurement dollars were split between large and small buys. The number of buys which used the BOA method were not available and therefore there is no entry under the % column for BOAs. [Ref. 21]

Type of buy:	Consumables Days	%	Repairables Days	%
Large	325	23	325	54
Small	280	77	300	46
BOA	245		270	

Basic Ordering Agreements (BOA) displayed the smallest ALT, small purchases (less than $25,000) were next, and large purchases (greater than or equal to $25,000) demonstrated the largest ALT value. In both consumable and repairable cases, if competitive procurement was not used, between 14 and 24 percent of the ALT was eliminated [Ref. 21].

The Logistics Management Institute (LMI) reported in their September 1986 study [Ref. 18] that the: [Ref. 18: p. 1-3]

> ...lengthening of administrative leadtime (ALT), ..., has been a direct result of DOD efforts to improve spare parts management. The Competition In Contracting Act (CICA), price review and analysis, breakout, and other related initiatives, have clearly increased wholesale administrative leadtimes and resultant inventory levels.

Although the fact that ALT has grown enormously since 1979 is readily acknowledged, the effects of an increased ALT on item availability are not as readily deciphered. In SPCC's UICP, ALT is obtained by subtracting forecasted PLT from forecasted PCLT. The UICP never computes the actual ALT for a procurement action. The LMI report showed that in a comparison of file ALT to actual ALT, SPCC's mean file value was 144 days while its mean actual value was 210 days, thereby resulting in the file data being understated by approximately 32%. The net result of this understated file ALT is that the spare parts buying process of SDR is triggered too late. By buying too late, the buyers cannot comply with the required delivery date (RDD) from the IM. This can lead to buyers ignoring the RDD or having to spend additional time attempting to expedite the delivery of that item. [Ref. 18:pp. 3-2, 4-4]

In the case of PLT at SPCC, as in ALT, an understatement problem exists. In the LMI report, mean file PLT was 518 days while mean actual PLT was 633 days. In this case the understatement was only 18%, but this still constituted a 115-day difference. After looking at individual items, the cause of the majority of SPCC's understatement was that in 12.3 percent of the items reviewed, the actual PLT exceeded twice the file PLT for the items in question. Of course the other extreme occurred as well, items being delivered much earlier than their due dates. Eight-and-a-half percent were

received in 0-50% of file PLT with an additional 34.9 percent being received in 51-90% of file PLT. [Ref. 18:pp. 3-5, 3-7]

One problem specifically noted in the LMI report was that the contracting RDD was typically oriented toward "ensuring that all potential suppliers can reasonably compete for the spare parts buy." [Ref. 18:p. 4-7] Since the RDD is set to permit maximum competition, there is no incentive for the vendors to bid for delivery any earlier than this date and risk termination for default should anything go wrong. The situation today with regards to PLT can best be summed up as LMI stated: [Ref. 18:p. 4-7]

> The result is that the DOD requirements process is often based on one assumed RDD and the DOD procurement process is based on a different RDD.

Is the Navy doomed to ever-expanding PCLT? In Chapter VI this question will be examined in regards to both the ALT reduction program and the QSTAR revised procurement program.

D. STRATIFICATION VS. SUPPLY DEMAND REVIEW (SDR)

One must first understand the differences between Stratification and SDR in both purposes and time frames in order to understand how in one case an item might be believed to be in long supply, yet a recommendation to procure additional units might occur as a result of looking at the same data from another viewpoint.

Stratification is a UICP program which is required to be run semiannually as of March 31/September 30 by DOD

Instruction 4140.24 [Ref. 19]. That Instruction prescribes: [Ref. 19:pp. 1,2]

> ...a uniform sequence of requirements priority and asset application for stratification of secondary items....The stratification process provides for the accumulation, extraction and display of basic supply data in a manner that relates assets to requirements in a specific priority/time sequence.

This DOD Instruction was implemented within the Navy by OPNAV Instruction 4440.16B [Ref. 22].

In more specific phrasing, Stratification can be seen as serving three purposes:

1. The means of computing various requirements levels and arranging them in order of priority (DOD-prescribed priority).
2. The basic tool ICPs use to establish their budget requests.
3. A way to identify items for potential disposal, i.e. those with assets in excess of the retention position.

Stratification runs as a steady-state model with no random demand (therefore an emulation rather than a simulation) over an eight- (September 30 Stratification) or ten- (March 31 Stratification) quarter time frame. The assumptions that stratification is based upon are: [Ref. 23]

1. Requirements and assets are reviewed continuously and are known at any point in time.
2. Demands occur evenly at the forecasted rate.
3. There is never more than one order outstanding at a time.
4. Orders are placed when the inventory position reaches the reorder point.
5. Calculations of order quantities and reorder points are made independently of one another.

6. The optimal policy is the minimization of TVC (Total Variable Costs).

7. The forecasted mean and variance of all random variables used in the model are constant over time.

8. The number of units demanded per requisition is not random, but equal to one.

Stratification contains four separate time frames:

1. Opening position - inventory status as of date Stratification is performed.

2. Current year - only for March Stratification, covers remainder of fiscal year after the Stratification processing date.

3. Apportionment year - 12 months following current year.

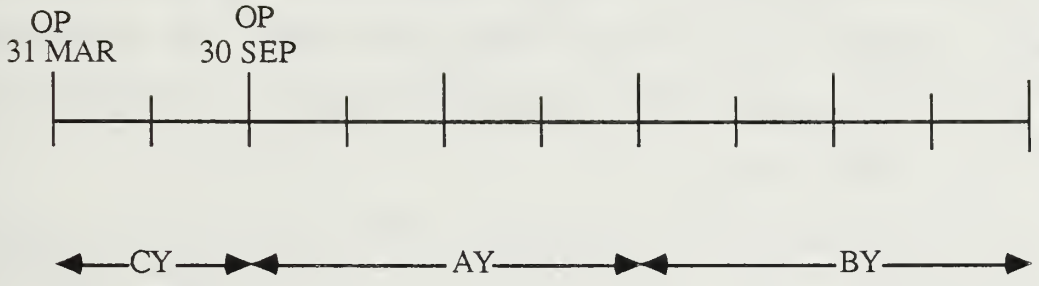
4. Budget year - 12 months from the end of the Apportionment year to the following September 30.

A graphic presentation of these time frames is shown in Figure 2-1.

Stratification, when run, computes all requirements through the budget year. It then applies the opening position assets to these requirements and calculates any deficiencies or excesses that occur. One of the outputs of Stratification is called "Table I, Budget Stratification." It is this table which the ICPs use as their primary tool for determining their budget request. "Table II, Readiness Retention Stratification," is how items potentially in long supply are identified. [Ref. 24:pp. 5-I-46, 5-I-49]

The purpose of Supply Demand Review (SDR) is to: [Ref. 25:p. 1-8]

> ...compute and compare system assets and system requirements. Based on this review, there will either



OP (Opening Position) - Snapshot of day Stratification run

CY (Current Year) - Quarters remaining in Current fiscal year

AY (Apportionment Year) - Next fiscal year; 1 OCT- 30 SEP

BY (Budget Year) - Fiscal year after next fiscal year

Figure 2-1. Stratification Time Line

be an excess or a deficiency of system stock for a particular item. In addition, an individual stock point may be deficient of an item.

As will be discussed in Chapter III, transactions reporting procedures assume that a continuous review is done. If there were no constraints, SDR would be run daily. Unfortunately there are constraints on both computer and personnel work loads. NAVSUP Instruction 4440.166A [Ref. 26] established the policy governing the frequency of SDRs at the ICPs. This policy is: [Ref. 26:p. 1]

> The ICPs shall have the goal of performing SDR at least once weekly for all centrally-managed secondary items. Tolerance limits for the elapsed time between SDR runs are: for consumables, two weeks except when Quarterly Levels Setting or Stratification scrubs are being done; for repairables, six weeks.

SPCC currently is meeting the tolerance requirements for conducting SDRs. An example of the time sequence of events for a single SDR is as follows: [Ref. 27]

10 March		Thursday	SDR Run (normally completed over the weekend).
14 March	AM	Monday	SDR delivered to a clerk in SPCC 05, who breaks the SDR down by department.
14 March	PM	Monday	IMs receive their SDR outputs.
23 March	PM	Wednesday	Deadline for IMs to "work" SDR. They normally hand in their inputs as completed. High dollar value and high impact items are done first.
24 March		Thursday	The IMs inputs are delivered to the keypunch section. Here the IM's input is entered into the tape for the UICP to use. This is same date new SDR is run, waits for inputs from old SDR.

25-27 March Fri-Sun UICP runs, outputting both Purchase Orders and Due-in Termination cards.

28 March Monday The purchase orders output from the UICP are delivered by data processing to SPCC 054 for "foldering". As an ALT reduction initiative for FY88, SPCC code 05's goal is to take less than 20 days to process these folders and deliver them to SPCC's contracting department.

Once each quarter this two-week turnaround is slipped to three weeks to allow for levels settings. Levels setting results in updated cyclic data sheets for the IMs to examine. These cyclic data sheets contain forecasts for such random variables as demand and procurement lead time, and the reorder point and reorder quantity which UICP will use for the next three months for the item.

SDR compares assets to inventory requirements. The following is how these are broken down: [Ref. 25:p. 1-10]

ASSETS	REQUIREMENTS
On hand	Backorders
Due-in	War Reserve
Authorized Disposal	Due-out
	Reorder Level
	Scheduled PPRs

If requirements are greater than assets, SDR will recommend: [Ref. 25:p. 1-8]

1. Expediting outstanding contracts
2. Recalling outstanding disposal actions
3. Issuing procurement orders

If assets are greater than requirements, SDR will recommend[8]:

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[8]The SDR recommendation is dollar limit constrained. This constraint will be discussed further in Chapter VI.

1. Terminating purchase requests

2. Terminating contracts

The similarities between Stratification and SDR include: [Ref. 23]

1. They both use the same data base:
   MDF (Master Data File)
   DDF (Due-in/Due-out File)
   PPR (Planned Program Requirements File)

2. They both compute Order Quantity (Q) and Reorder Level (R) using the same basic UICP formula.

3. They recommend the review of long supply items (but not necessarily the same items or quantities. This is discussed in greater depth in Chapter V).

The differences between Stratification and SDR include: [Ref. 23]

1. Purpose:
   Stratification - primarily the basis for budget requirements.
   SDR - executes the budget (what to buy, when to buy, and where to put material).

2. Time horizons:
   Stratification - 24 to 30 months
   SDR - procurement lead time (PCLT)

3. Levels:
   Stratification - calculates its own levels and runs as a steady-state model with no random demand.
   SDR - quarterly levels computations which are based upon actual demand and thus include the past quarters random demands.

4. Frequency:
   Stratification - semi-annual for budget purposes
   SDR - weekly per NAVSUP Instruction 4440.166A [Ref. 26], however SPCC conducts them normally on a bi-weekly basis.

5. Results:
   Stratification - does not trigger a firm buy, DDF is unchanged.

SDR - triggers a buy. The DDF is changed either as soon as the IM concurs, or automatically if the buy is a low dollar amount.

This section has provided a brief look at Stratification and SDR. It is important to understand how Stratification and SDR differ in order to understand how one might recommend cancellation while the other will recommend procuring more of the item. This disparity can result in items being considered to be in long supply when by the other systems description, the item is in short supply for the time period that it considers. In Chapter VI, the basics described here will be placed in perspective with the current problems facing the Navy and specifically SPCC.

E. SUMMARY

This chapter has described how the problem of items in long supply has received increasing emphasis in recent years. How items come to be in long supply was also discussed. The effects or potential effects of increasing PCLT were discussed. The basic similarities and differences between Stratification and SDR were listed. The next chapter lays the groundwork for how items are identified by the requirements determination process as needing to be ordered.

III. REQUIREMENTS DETERMINATION

A. INTRODUCTION

As was discussed in Chapter II, there are numerous ways that secondary items might end up being in long supply. This Chapter will discuss how the decision is originally made as to when and how many of each item should be ordered.

B. THE PURPOSE OF INVENTORY

Prichard and Eagle, in their book entitled Modern Inventory Management, list six reasons for having inventories. These are: [Ref. 28:p. 1-2]

1. to save time by avoiding a prohibitively large procurement work load,
2. to balance incoming materials against production schedules or sales,
3. to keep a production line operating continuously,
4. to keep sufficient stocks to meet sales demands with a minimum of sales losses due to stockouts,
5. to uncouple the supplier and customer. The inventory acts as a buffer between a supplier who generally supplies materials in large amounts at a steady rate and a user who generally buys the output or uses the material in smaller or more variable quantities, or
6. to receive discounts since the price of goods is a prime consideration in establishing an inventory. Lower prices are sometimes available when procuring larger quantities of an item.

The Navy maintains inventories for two different categories of items: non-demand based items and demand based

items. Non-demand based inventories are further divided into two separate categories, insurance items and Numeric Stockage Objective (NSO) items. An insurance item is: [Ref. 24:p. 1-5]

> ...an essential item that will not fail in normal usage, but if it does fail or a loss occurs, the lack of a replacement would seriously hamper the operation of a weapon system.

NSO items are: [Ref. 24:p. 1-5]

> ...items with a predicted usage too low to qualify as a demand based item, but the lack of a replacement item would seriously hamper the operation of a weapon system.

Demand based inventories in the U.S. Navy exist for four main reasons. They: (1) serve a decoupling function, (2) allow for transportation time, (3) permit buffer or safety stock inventories, or (4) are review cycle inventories [Ref. 24:pp. 1-5,1-6].

C. THE HISTORY OF INVENTORY MANAGEMENT

The existence of inventories of goods is reported in the Old Testament of the Bible. In the past, inventories, even those which were greatly in excess of known requirements or storage capacity, were considered to be indications of wealth. "An individual's wealth was usually assessed by the size of his flocks, herds, granaries, warehouses, etc.." [Ref. 29:p. 3]

In today's modern industrial economy, the increased emphasis on liquidity has led businessmen to hold cash or securities in lieu of larger inventories. This point was

driven home during the "inventory depression" of 1921 when "(i)nventories which had made men rich in the preceding period bankrupted them now. Forced sales, cut prices, liquidations, were rife." [Ref. 29:p. 6]

It was during this time frame that Ford Harris of the Westinghouse Corporation in 1915, and others came up with the "simple lot size formula." This formula, upon which the current Navy inventory control programs are based, is often referred to as "the Wilson formula, since it was also derived by R.H. Wilson as an integral part of the inventory control scheme which he sold to many organizations." [Ref. 30:p. 3]

With the advent of operations research after World War II, detailed attention was given to the stochastic nature of inventory problems. It is notable that engineers rather than economists were the first to use analytical techniques in attempts to solve actual inventory problems. As Hadley and Whitin stated: [Ref. 30:p. 3]

> It is interesting to observe that economists were not the first to take an active interest in inventory problems even though inventories play a crucial role in the study of dynamic economic behavior. The reason for this lack of interest probably lies in the fact that economists were concentrating their attention mainly on static equilibrium models.

Today, with the use of computers, many simulations or emulations can be run in very short order in attempts to make better use of both dollars and inventories in many varying conditions.

D. NAVY INVENTORY LEVELS

The three levels of peacetime inventory for the Navy are wholesale level, retail-intermediate level and retail-consumer level. The wholesale level is the area of interest to this thesis. At the wholesale level, the Item Manager (IM) who works at an Inventory Control Point (ICP)--ASO and SPCC for the Navy--has visibility and control of assets nationwide. The retail-intermediate level inventory is between wholesale and retail-consumer levels and supplies a given geographic area (this category of material would reside along with the wholesale material at an NSC, NSD, or NAS in the Navy). The retail-consumer level is material held strictly for the unit's own use or consumption (the stores onboard the vast majority of the Navy's ships).

In addition to the peacetime inventory levels, the Navy is required to maintain war reserve material. The war reserve material requirement is defined as "the total material needed to sustain mobilization operations during the period prescribed by DOD for war material planning purposes." [Ref. 24:p. 1-4] This is further broken down into two basic segments, war reserve material and prepositioned war reserve material, the difference being where the stock is physically located. [Ref. 24:p. 1-4]

This thesis will address wholesale peacetime requirements as well as war reserve material requirements in determining

the correct amount of inventory that should be on hand or on order.

E. INVENTORY SYSTEMS IN USE

There are two basic questions which any inventory system must answer. Such a management system must determine first, when an order should be placed, and second, how much should be ordered. [Ref. 30:p. 1]

The oldest, and perhaps simplest inventory control system is the "two-bin" system. This system uses two physical bins, one bin which satisfies demand between receiving one order and placing the next, and a second bin which contains enough stock to satisfy probable demands during the replenishment period. Whitin noted two advantages of the "two-bin" system; they decrease the need for physical inventories as well as reduce the need for maintaining a continuous inventory. Disadvantages do exist with this system. These include the fact that no trend data for sales is available. This system also fails to quantify the best amount to actually order when the first bin is empty. Additionally, opportunities for freight or quantity discounts are lost by ordering items separately. [Ref. 29:pp. 15-16]

Another inventory system in use is one in which the "ordering cycle" plays a major factor. Generally, the shorter the ordering cycle, the smaller the level of inventory required relative to sales, and thus a quicker stock turnover occurs. Another term for this system is "days

of supply", as inventory levels are expressed in XX days of supply at a fixed rate of demand. The setting of the exact value for days of supply is based upon inputs such as; a minimum inventory level, forecasted demand, time lag between passing through the reorder point and placing the actual order, the time the procurement system requires to requisition stock, the vendor's required time to produce, and the transportation time required.

Whitin, in his 1957 book, stated: [Ref. 29:p. 20]

> Many inventory control systems in actual use have been greatly simplified by using only one ordering cycle for all classes of items. Some are further simplified by establishing supply control levels on an across-the-board basis.

The across-the-board basis accurately described SPCC's twelve-month minimum constraint for all order quantities up until June 1987. This constraint on smaller EOQ orders existed due to a desire to reduce the workload of SPCC's contracting department. In June 1987, SPCC revised its ordering policy to take advantage of both item demand trends and quantity price discounts. Further discussions of SPCC's new ordering policy are included in Chapter VI.

Whitin stated that in order to justify these across-the-board levels, it was necessary to show that all items: [Ref. 29:p. 20]

1. have the same lag time, (the sum of manufacturing time, posting time, transport time, etc.);
2. have the same variations in lag time;
3. have the same expected demand distribution;

4. have the same cost of depletion;

5. have the same carrying charge (depreciation, obsolescence, insurance, risk, storage, etc.);

6. have the same costs involved in placing orders;

7. have the same quantity discounts.

Due to the nature of the business that SPCC is in, it is apparent from the above list that across-the-board levels were not truly justifiable, but were implemented anyway. This apparently occurred due to a perceived, if not actual, overwhelming work load on the contracting division.

The last inventory system in use to be described is a combination of the two-bin and the ordering cycle systems. The Navy uses this type of control, as the current UICP system operates just as the ordering cycle system previously mentioned does, but with the addition of a safety stock. This mixed system takes the best parts from both the two-bin and the ordering cycle systems and eliminates some of the problems from both systems. Due to the improved result that this mixed system provides, as well as the fact that this is what the current UICP is based upon, this thesis will concentrate only on the Navy's mixed system.

F. INVENTORY PROCEDURES USED

There are two basic procedures used in implementing an inventory system. The first is called perpetual, continuous review, or transactions reporting. For purposes of this thesis, this procedure will be called transactions reporting.

The second is called periodic review. This section discusses the differences between these two procedures.

In the transactions reporting procedure, running totals of material on-hand are kept by a transaction reporting system for every item in order to determine the correct time to reorder. Under this procedure, the quantity to order is a predetermined amount based in part upon the economic order quantity (EOQ) formula, which depends on expected demand, holding cost rate, administrative order cost and material cost.

The EOQ model for determining the optimal order quantity Q (for non-repairable items) when backorders are not considered is:

$$Q = \text{SQRT}(8AD/IC)$$

where

SQRT= Square root of the quantity in brackets

A = The administrative order cost

D = Quarterly demand average

I = The holding cost rate including consideration of investment cost, storage, obsolescence and losses

C = The replacement cost of the item

This formula has been called "the lot size formula, the economic order quantity, the square root formula, or the Wilson formula." [Ref. 30:p. 34] The term economic order quantity (EOQ) will be used throughout this thesis.

Assumptions that the EOQ formula is based upon include: [Ref. 31:pp. 497-498]

1. Demand is known with certainty and is constant over time.

2. Lead time is zero; that is, an order is received at the instant it is placed.

3. An order-point system is employed, thus inventories are reviewed continuously.

4. Inventory is replenished when inventory is exactly zero. No safety stock is employed and no shortages (stockouts) are allowed.

5. Inventory replenishment is instantaneous; that is, the entire order is received in a single batch.

6. The order quantity is constant for each replenishment order.

7. The problem involves a single-stage system.

8. There is an infinite time horizon.

9. All costs are constant over the infinite time horizon.

Additional assumptions were identified by Hadley and Whitin for cases in which backorders were allowed. These included assuming no interaction between items, unit cost being constant and independent of order quantity, a constant backorder cost, never more than one order outstanding, and a positive reorder point. [Ref. 30:pp. 162-163]

The Reorder Level (RL) (for non-repairable items) is used to determine exactly when to order the reorder quantity, Q, that was determined using the EOQ formula. RL is a function of the variability of demand, the lead time demand, and economic considerations.

$$RL = (D \times L) + SL$$

where

D = Quarterly demand average

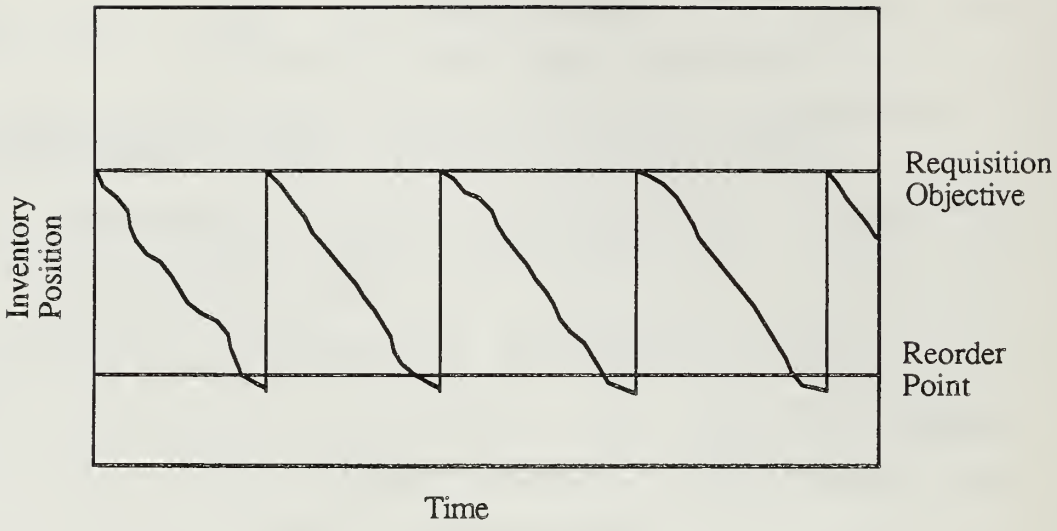
L = Procurement lead time in quarters

SL = Safety level, which is a function of demand and lead time variability and the desired level of service

Figure 3-1 illustrates the basic characteristics of the EOQ model in the transactions reporting procedure.

Figure 3-2 shows that the optimal Q occurs at the point where the slope of the ordering cost curve is the negative of the slope of the inventory carrying cost curve. Of interest in Figure 3-2 is the fact that the slope to either side of the optimal Q is relatively flat. This illustrates that there is a good deal of "slop" allowed in the optimal Q before total costs are changed drastically.

Using the periodic review procedure, a fixed time interval is used to determine when to look at the inventory position of each item. A "snapshot" is taken at that specified time and a comparison is made of stock on hand or on order to the item's Requisitioning Objective (RO). The difference between the "snapshot" on hand or on order and the RO is placed on order. A higher average level of inventory is required for the periodic review procedure as compared to the transactions reporting procedure. This is due to the requirement in the periodic review procedure to maintain an increased safety stock level. The reason for this increased safety stock is the requirement to hold not only enough material to meet expected demands after reordering but of



Requisition Objective = Reorder Point + EOQ
+ deficiency below reorder point

Figure 3-1. Continuous Review Procedure

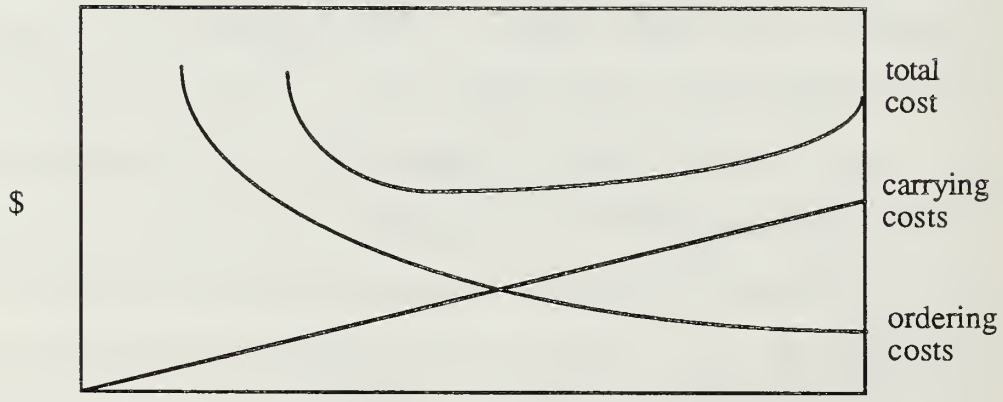


Figure 3-2. Cost Curves

meeting the demands between hitting the reorder point and reaching the end of that periodic cycle when the actual order is placed. Figure 3-3 graphically represents the periodic review procedure in operation.

The RO in the periodic review procedure must include at least one review time demand period, one procurement lead time demand period, and a safety level. The RO can be defined algebraically as: [Ref. 24:pp. 1-15, 1-16]

$$RO = (D \times L) + (D \times R) + SL$$

where:

D = Quarterly demand of the item.

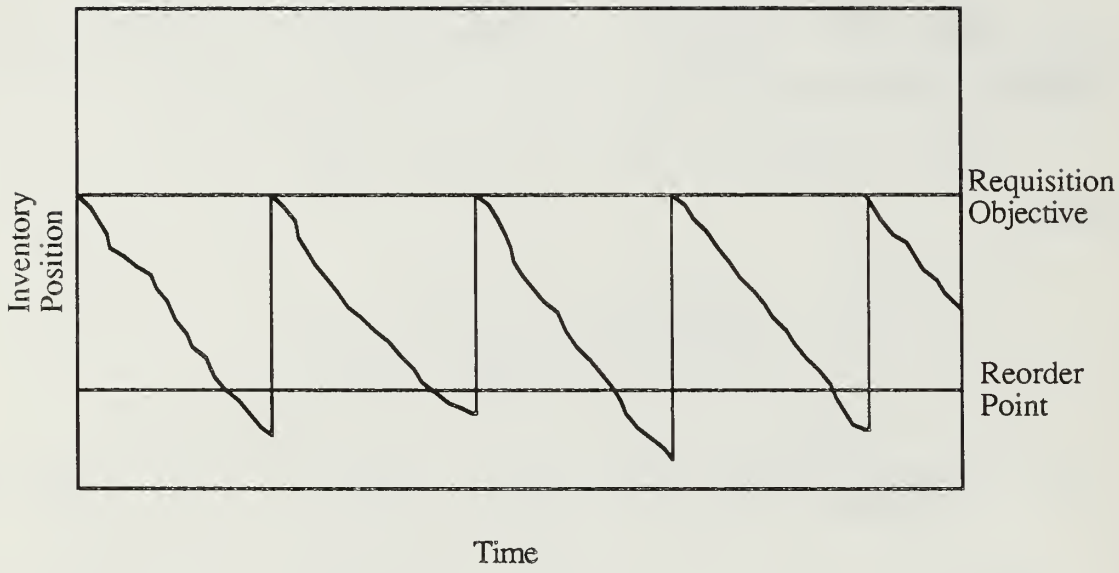
L = The procurement lead time in quarters.

R = The length of the review period in quarters.

SL = Safety level, a function of demand and lead time variability and the desired level of service.

Although there is a higher investment cost due to the increased investment level, a partial savings is obtained due to less clerical and data processing costs. Hadley and Whitin stated that the best use of the periodic review procedure is on inexpensive items in which the review and processing costs are high and the item investment and holding costs are low. [Ref. 30:p. 235]

With the trend towards decreasing data processing costs, there is more incentive to convert inventory systems to transactions reporting. This way more timely changes in demand can be quickly noted and the average investment in inventory can be decreased. Hadley and Whitin stated that



Requisition Objective = Reorder Point + EOQ + deficiency below reorder point

Figure 3-3. Periodic Review Procedure

"what really determines which system is to be preferred is the cost of operating a transaction reporting system, as compared with that of operating a periodic review system." [Ref. 30:pp. 281-282]

G. SUMMARY

This chapter has provided a brief summary of some important inventory management procedures. The fact that the Navy's UICP model is a mixed inventory control system supposedly working within the framework of a transactions reporting procedure was discussed. Chapter VI will discuss how the transactions reporting procedure is used at SPCC in such a manner that, at times, it appears to be a periodic review procedure instead of a transactions reporting procedure.

IV. CONTRACT TERMINATION

A. INTRODUCTION

Once there has been a determination made that indeed an item is in long supply, and it is not that way purposely, some action must be taken. The first alternative is to allow the contract to continue until completion. The second alternative would be to completely stop the procurement with a complete termination of the contract. The third alternative is to partially terminate the contract, thus allowing for partial delivery of some of the contracted items. Although the majority of this Chapter deals with complete terminations, partial terminations would use similar procedures for the quantity canceled. When discussing the costs involved in the decision process, Chapter V will briefly touch on the distinction between partial and complete contract terminations.

B. TYPES OF CONTRACT TERMINATION

In Government contracts there are four means by which to terminate a contract prior to its completion. They are:

1. Termination for Default,
2. Termination for Convenience,
3. No-cost settlement, or
4. Failure to provide additional funds under the Limitation of Cost or Limitation of Funds clause when

the available funds have been expended and the work is incomplete [Ref. 32:p. 524].

1. Termination for Default:

a. Fixed-price contracts [Ref. 33: 49.402-1]

The Government has the right to terminate the contract completely or partially for default if the contractor fails to:

(i) make delivery of the supplies or perform the services within the time specified in the contract,

(ii) perform any other provision of the contract, or

(iii) make progress and that failure endangers performance of the contract.

b. Cost-reimbursement contracts [Ref. 33: 49.403]

The Government must provide a 10 day notice to the contractor before termination for default.

c. Potential problems which can develop when a termination for default on contracts for items in long supply is enacted include: [Ref. 34:p. 184]

(i) if any advance or progress payments have been paid to the contractor for work not yet performed, they must be recovered,

(ii) the procuring contracting officer (PCO) must send representatives to the contractor's work location and account for all work (thus far) accomplished, and

(iii) many contractors take the Federal Government to court (claiming breach of contract by the Federal Government), thus delaying the termination process even further.

2. Termination for Convenience:

Terminations for convenience usually are enacted when: [Ref. 34:p. 19]

a. the Federal Government is no longer in need of the product being manufactured (e.g. the spare parts which

are already in stock are in excess of new requirements),

b. there has been a change in the specifications (engineering changes) for the contracted item,

c. there is a change in political policy (e.g. ultimate disapproval of SST's),

d. there is poor contract administration,

e. there has been a "bad buy" (improperly justified, impossibility of performance, or insufficiently researched requirements), or

f. a termination for default is overturned by the Armed Services Board of Contract Appeals (ASBCA) and a termination for convenience is awarded.

A major difference between convenience and default terminations of cost-reimbursement type contracts is that a contractor must be given a 10-day notice prior to termination for default while no advance notice is required for termination for convenience.

3. No-Cost Settlement:

The Federal Acquisition Regulations (FAR) state: [Ref. 33: 49.101(b)]

> The contracting officer shall effect a no-cost settlement instead of issuing a termination notice when (1) it is known that the contractor will accept one, (2) Government property was not furnished, and (3) there are no outstanding payments, debts due the Government, or other contractor obligations.

4. Limitation of Cost and Limitation of Funds:

This method can be used by simply failing to provide additional funds under the Limitation of Cost clause when the available funds have been expended and the work is incomplete. [Ref. 32:p. 524]

As this thesis is concerned with termination of contracts for secondary items in long supply, the majority of the contract terminations will be for the convenience of the Government. Therefore the following section describes the historical background of the use of convenience terminations.

C. HISTORICAL BACKGROUND

The ability of the Government to terminate a contract for its convenience, whether or not the contractor is at fault, was developed primarily as a "wartime concept, and it was a way for the government to avoid the continuance of contracts that the rapid changes of war, or the war's end, had made useless or senseless." [Ref. 35:p. 9] The right of the Government to terminate a contract for its convenience and enter into a settlement agreement was established by the Supreme Court decision in United States v. Corliss Steam Engine Company in 1875 [Ref 36]. The approval of the negotiated settlement of the Corliss claim was the foundation of the "termination and settlement policy which was to become such an important aspect of future government procurement." [Ref. 37:p. 3] In this case, [Ref. 38:p. I-2]

> ...the Navy instructed a contractor to discontinue work on a contract for engines and boilers required during the Civil War. Under the existing contract, there were no provisions authorizing the termination. The Corliss Engine Company offered to settle all of its claims on the basis of either retaining the machinery in process and receiving a settlement of $150,000, or delivering the incomplete machinery to the Charleston Navy Yard for $259,000.

The Navy decided to accept the delivery of the incomplete machinery. Unfortunately, the Navy had no appropriation money available to pay for this option, so a certificate of indebtedness was issued instead. The Comptroller of the Treasury declined to accept the certificate on the grounds that "the settlement was not fair and reasonable and the contracting officer had no legitimate authority to enter into such an agreement." [Ref. 37:p. 3] Congress then got involved by passing legislation that prevented the use of annual appropriations for ship-building to pay the previously agreed amount and instructed the Navy to deduct from the contract price the sum it would have cost Corliss to complete the contract. The Navy then determined that Corliss should be paid $140,978. Corliss appealed to the Court of Claims stating that the certificate of indebtedness of $259,000 should be honored. The Court of Claims found in favor of Corliss since no fraud or misrepresentation was proven. The Government appealed to the Supreme Court, but the Supreme Court held that the original settlement was binding on the Government and therefore could not be challenged. [Ref. 36]

The next major war was World War I, during which the Corliss doctrine grew to become a very important part of military procurement. In 1917 Congress passed the Urgent Deficiency Appropriation Act [Ref. 39]. This Act was in response to a "two-pronged concern that the government not have to remain committed for obsolete items during the war or

for stockpiles of items at the war's end." [Ref. 35:p. 10] The Act authorized the President, until six months after a final treaty of peace "(t)o modify, suspend, cancel, or requisition any existing or future contract for the building, production, or purchase of ships or material." [Ref. 39] In such case, the Government was to make "just compensation therefor." [Ref. 39]

Besides the Urgent Deficiency Appropriation Act, special contract clauses were used. One example is in Davis Sewing Machine Co. v. United States [Ref. 40] which involved a contract for the procurement of Very pistols. The termination clause stated, [Ref. 40]

> This contract being necessitated by a state of war now existing, it is desirable and expedient that provision be made for its cancellation upon termination or limitation of the war, or if in anticipation thereof or because of changes in methods of warfare the Chief of Ordnance should be of the opinion that the completion of this contract has become unnecessary. It is therefore provided that any time, and from time to time, during the currency of this contract, the Chief of Ordnance may for any of the clauses above stated notify the contractor that any part or parts of the articles then remaining undelivered shall not be manufactured or delivered.

As stated in Torncello, the intent of both the statute and the contract clause was [Ref. 35:p. 11]

> ...just to handle changed conditions, relieving the government of the risk of receiving obsolete or useless goods. The risk was shifted to the contractor that it could lose the full benefit of its expectations if circumstances changed too radically.

By 1922, $505 million had been paid to retire World War I contracts which if allowed to run to completion would have cost nearly $4 billion. [Ref. 41:p. 200]

World War II brought with it the Contract Settlement Act of 1944. The objectives of this Act were to achieve maximum war production, expedite reconversion to civilian production after the war, permit timely settlements, and ensure uniformity among Governmental agencies. [Ref 42]

This policy provided for a post-termination process of arriving at a fair and responsible settlement amount through negotiation. This Act was used to achieve approximately 319,000 terminations for convenience during the period of 1 July 1944 until 31 March 1947. [Ref. 41:p. 208]

For Government defense contracts entered into after 19 May 1948, the effective date of the Armed Services Procurement Act of 1947 [Ref 43], the Contract Settlement Act of 1944 does not apply. The Armed Services Procurement Act of 1947 established the Armed Services Procurement Regulation (ASPR) [Ref. 44] which provided the Government the right to terminate contracts for convenience and made mandatory a Termination for Convenience clause for most Government contracts. [Ref. 44: 7-103.21] Even though the ASPR required the Termination for Convenience clause to be present, situations did occur where the clause was physically left out. This problem area was rectified when the Court of Claims issued an opinion which declared that since the procurement regulations have the force and effect of law, a contract could be considered to have the required termination

for convenience clause incorporated even though it is not physically present in the contract. [Ref. 45]

The termination provision, besides verifying the Government's right to terminate "whenever the Contracting Officer shall determine that such termination is in the best interests of the Government," [Ref. 44: 7-103.21(a)] also specified again that the Government would not pay anticipatory profits for what would otherwise be a common law breach situation. [Ref. 44: 7-103.21(e)(ii)(c)] Duties of both the contractor and contracting officer were also specified. All was not negative for the contractor, as according to the ASPR, he could be compensated for certain types of costs which had been incurred even though no benefit in the form of an end item was received by the Government.

In January 1952, termination procedures and policies were formally established in Section VIII of the ASPR [Ref. 41:p. 208]. In November 1959, the termination principles were changed slightly and were moved to Section XV of the ASPR. The new location of the termination for convenience principles became important with the issuance of Defense Department Circular 79 of 15 May 1970. This circular added fixed price contracts to Section XV which previously only applied to cost-reimbursement type contracts [Ref. 46:p. 875]. The importance of Section XV of the ASPR is that the cost principles listed are those which are used in all actions to claim, negotiate, or determine costs which are

applicable to termination settlements [Ref. 44: 8-214]. These principles are specified in the Termination for Convenience clause as being applicable to calculating the termination settlement either through negotiations or by unilateral decision of the contracting officer. [Ref. 44: 7-103.21(f)]

Over time the ASPR was replaced by the Defense Acquisition Regulations which continued to require the mandatory Termination for Convenience clauses in the majority of DOD contracts over $1,000 [Ref. 47: 8-701-705]. The Defense Acquisition Regulations were replaced in 1984 by the Federal Acquisition Regulations (FAR) which continued to require the broad use of Termination for Convenience clauses [Ref. 33: 49.502]. Thus, over the years, the clauses which originally were developed for war contracts are now applied to all executive branches and to all types of contracts, both in times of peace and of war.

Two important concepts have arisen from various Boards and Court cases. As this thesis concerns the Armed Services, only the Armed Services Board of Contract Appeals (ASBCA) and the Federal Court of Claims (now called the U.S. Claims Court) decisions will be reviewed.

The first concept is that the Government's motive for terminating a contract is not an issue except in three instances cited by Cibinic and Nash: [Ref. 48:pp. 822-825]

a. **Government Bad Faith**

A contracting officer is not permitted to exercise rights under the Termination for Convenience clause if such exercise demonstrates bad faith...

b. **No Change in Circumstances**

In Ronald A. Torncello v. United States, 231 Ct. Cl. 20,681 F.2d 756 (1982) [Ref. 35] the court ruled that the Termination for Convenience clause could not be used to avoid anticipated profits unless there had been some change in circumstances between the time of award of the contract and the time of termination...

c. **Violation of Paramount Government Policies**

The courts have enjoined convenience terminations on the grounds that they violate or avoid other Government policies of paramount importance...

This motive issue is clearly seen in Thomas C. Wilson, Inc. v. United States, 83-1 BCA 16,149, ASBCA No. 26035, p. 80,279, 16 November 1982 where:

A contract for the supply of tube repair plugs was properly terminated for default because the contractor did not make timely delivery. The Government's termination under the default clause was not unconscionable, despite the fact that it no longer needed the plugs. Inclusion of the default clause and agreement to a specified delivery date in the contract made time of the essence, even though the Government no longer needed the plugs....Government had the right just the same as Wilson had the right to insist on payment of the purchase price regardless of Wilson's need or lack of need for such money if it performed in accordance with the agreement.

The second concept is that the Government's right to terminate for convenience is waived when the right to terminate for default or accept a no-cost settlement is present.

In Artisan Electronics Corp., 73-1 BCA 9807, p. 45,820

ASBCA No. 14154, 30 November 1972 this concept was clearly stated:

> Except for no cost cancellations, where the right to terminate for default exists, the contracting officer not only may, but, under the cited regulations of his agency, must terminate for default if he is to terminate at all. Under such circumstances he may not terminate for the convenience of the Government.

This was again more recently declared in Control Mechanisms, Inc., 83-1 BCA 16,155, ASBCA No. 27,180, p. 80,295 17 November 1982 when it was stated:

> That (in the absence of bad faith) the Board normally inquires into the existence of the right to terminate for default, not the judgment leading to its exercise; and that contracting officers are not authorized to terminate for convenience, except at no cost to the government, when the right to terminate for default exists, even if the supplies contracted for are no longer required.

D. TERMINATION PROCEDURES

Assuming that the contracting officer has indeed decided that it is in the best interest of the Government to terminate the contract for the Government's convenience, FAR 49.102(a) provides that:

> The contracting officer shall terminate contracts for convenience or default only by a written notice to the contractor (see 49.601). When the notice is mailed, it shall be sent by certified mail, return receipt requested. When the contracting office arranges for hand delivery of the notice, a written acknowledgement shall be obtained from the contractor. The notice shall state:
>
> (1) That the contract is being terminated for the convenience of the Government (or for default) under the contract clause authorizing the termination;
>
> (2) The effective date of termination;
>
> (3) The extent of termination;
>
> (4) Any special instructions; and

(5) The steps the contractor should take to minimize the impact on personnel if the termination, together with all other outstanding terminations, will result in a significant reduction in the contractor's work force (see paragraph (g) of the notice in 49.601-2). If the termination notice is by telegram, include these "steps" in the confirming letter or modification.

When the Procurement Contracting Officer (PCO) prepares and issues the termination notice to the contractor, a copy should also be sent to the applicable contract administrative agency. The majority of the contract administration functions for DOD are handled by the Defense Contract Administration Service (DCAS), a branch of the Defense Logistics Agency. DCAS has assigned the Termination Contracting Officer (TCO) function to its nine DCAS Regions (DCASRs) and has issued a manual, DLAM 8110.1 titled "Termination Manual for Contract Administration Services" which: [Ref. 49:p. i]

> ...prescribes policies and procedures for the guidance of field personnel responsible for the settlement of contracts which have been terminated in whole or in part for the convenience of the Government.

The TCO commences the field administration of the termination case upon receipt of a copy of the termination notice by the appropriate DCASR office. The duties of the TCO are listed in detail in sections 49.105 of the FAR, DFARS and DLAM 8110.1. Of interest to both the PCO and his financial managers is the fact that final termination settlement proposals can take up to one year to be submitted, plus the additional time required for negotiation in order to

come to a final dollar figure [Ref. 33: 52.249-2(d)]. This loss of potential obligation authority should be considered in making the decision whether or not to terminate a contract. Of interest to the PCO and TCO is a statement by Cibinic and Nash that: [Ref. 48:p. 841]

> ...the effect of a termination for convenience is to convert a fixed price contract into a cost reimbursement contract as to the work performed up to the effective date of the termination.

Another potential pitfall of terminating a contract is the dispensation of the termination inventory, be it in fully completed units, work-in-progress, or even raw material. Additional costs can quickly exceed any expected savings once the government finishes storing and stocking the items, creating new Navy Item Control Numbers for partially completed items, performing physical inventories, and ultimately disposing of or redistributing the various odd parts.

E. SUMMARY

This chapter has provided background material on how Terminations for Convenience were originated, as well as how current statutes and legal case histories have set the tone for use of these terminations in recent years.

V. COSTS TO BE CONSIDERED

A. INTRODUCTION

It is frequently unclear if a purchase request or a contract should be terminated. As the GAO has reported as far back as 1957, IMs were not doing cost-benefit analysis computations which compared the cost to terminate with the cost to continue. This Chapter will identify and discuss costs which need to be considered before making the "correct" decision regarding secondary items in long supply.

While not easily defined as either a cost to continue or as a cost to terminate, the most obvious cost incurred is the difference between funds obligated and funds which can be recovered for those items to be terminated. This dollar amount varies from inconsequential to very substantial. As will be discussed in Chapter VI, NAVSUP and SPCC have recently begun collecting data on the correlation of elapsed production lead time with the contractor's proposed cost to terminate. This data collection eventually should assist IMs in evaluating what dollar amount should be recovered if the contract is terminated.

B. COSTS INCURRED BY CONTINUING THE CONTRACT

Administrative costs would not increase significantly from those incurred when the original order was placed.

Possibly the additional administrative cost would be in a series of telephone calls from the PCO to the Administrative Contracting Officer (ACO) to confirm that indeed everything was proceeding properly and to ensure timely delivery of the item. This cost would probably be quite low and therefore plays no real role in the decision to terminate.

A major factor in the decision whether to terminate or not is the variable cost to hold inventory. This cost consists of four factors; (1) the charge for investment of capital tied up in inventory, (2) losses due to obsolescence, (3) other losses of on-hand assets, and (4) storage costs [Ref. 50:Encl. 4].

With regard to investment cost, DOD policy states that "an annual investment charge of ten percent of the average on-hand inventory value will be made." [Ref. 50:Encl. 4] Recent Service and DOD-wide audits have used the current mean treasury rate for bonds of 1 to 30 years instead of this ten percent. The Air Force termination model and past GAO audits of the Air Force reflect a quarterly changing interest rate determination which is based upon the mean treasury rate for bonds. NAVSUP's (Naval Supply Systems Command) tentative termination model[9] uses the constant ten percent rate from DOD Instruction 4140.39. With treasury rates below ten percent for the present, NAVSUP's model would make holding

[9]NAVSUP's model is termed tentative as it is currently being programmed by FMSO for use on personal computers.

items in long supply more expensive and recommend more terminations than the Air Force model.

One modification to the investment cost figure which might more accurately reflect the actual obligational authority committed would be to multiply either an expected interest rate or the ten percent by not only the average on-hand inventory but also by the on-order dollar value as well. In 1970 when the instruction was first written, PCLT probably was 90 to 100 days, but now in these days of 750+ days of PCLT, this additional investment cost should be used to more accurately reflect the commitment of these funds which are no longer available for alternative uses. The time to commence charging this additional cost should be at the start of PLT. At that moment, the funds have been obligated and therefore are no longer available for other uses. Discounting this new figure to reflect the present value of future dollars would be even more precise, and would even more accurately reflect this cost. These modifications, in the researchers opinion, would better reflect the "true" investment cost.

The next cost is that of losses due to obsolescence. Included in this category are losses due to "technological obsolescence, over-forecasting of requirements, deterioration beyond the point of use, and other causes" [Ref. 50:Encl. 4]. Here DOD policy is that each ICP will compute separate obsolescence costs for each item it manages. Currently the Navy's UICP uses an obsolescence rate of ten percent for

repairables and twelve percent for consumables. NAVSUP's tentative termination model uses a flat ten percent for obsolescence. The Air Force uses two-and-a-half percent to reflect not only the risk of obsolescence, but also to cover the next cost category, other losses. Once again the Navy's values will result in higher holding costs than the Air Force's and thus in more terminations of contracts in long supply. Obsolescence charges are not discounted as they reflect the probability that what is bought today will be obsolete when the Navy finally decides to use it, thus these costs are incurred now.

The "other losses" category covers losses due to such causes as pilferage, shrinkage, or inventory adjustments. The basic Navy UICP treatment is to include this category in the same flat ten percent charge as was discussed in the above paragraph concerning obsolescence for both repairables and consumables. UICP adds to that ten percent charge an extra two percent charge for other losses to consumables. This consumables-only charge appears quite logical since pens and paper have many non-Navy applications while the repairable left-handed low pressure main engine turbine blade has no true non-Navy applications and is thus less likely to disappear from the inventory. NAVSUP's tentative termination model makes no use of this value and thereby understates the cost to continue the contract, resulting in fewer terminations being conducted on consumable items than in

reality should be. The researcher feels this value should be included in the Navy's termination model, and should be set to zero for repairables but charged at two percent for consumables to further enhance the model's value.

The last category of variable costs incurred in holding an item is that of storage. This cost represents both the day-to-day costs incurred in keeping the inventory as well as the cost of actual storage facilities. This cost includes: [Ref. 50:Encl 4]

> ...care of material in storage, rewarehousing costs, cost of physical inventory operations, preservation and packaging, training of storage personnel, cost of warehousing equipment and pro-rated services and overhead costs.

Both the Air Force and NAVSUP's tentative termination models use DOD's recommended value for storage of one percent of the average on-hand inventory value per year.

Another variable cost which should be addressed when attempting to determine all applicable costs which are incurred by continuing a contract is that of warehouse space and security. DOD has not had to worry about this problem until the recent past when GAO became interested in this area. GAO is currently reporting that DOD is running out of warehouse space and has poor security over what it has in storage [Ref. 15]. How to apportion the cost of providing adequate warehouse space and security to individual items or contracts is unclear and therefore no attempt to quantify this value for use in this thesis is attempted.

By adding up the appropriate variable costs to hold, a cost of holding figure can be derived. The next requirement for the IM to determine in order to arrive at the proper holding cost, is the length of time between the current delivery date and the actual required delivery date. This value is required to be in terms of years since that is how holding costs are stated. The last dollar value required to determine holding costs is the contract price of the units considered for cancellation.

The cost-to-continue equation, while quite straightforward as a linear function of years until use and value, is still sensitive to a subjective input: time until the items will actually be required. Although the tentative NAVSUP termination model uses 21% for its holding cost, the researcher has chosen 25% to be the holding cost value for the following examples. The reason for the additional four per cent holding cost is to reflect a more realistic time value of money for the investment segment, and an adjustment to the "other losses" segment in order to more accurately reflect consumable items losses.

The following examples illustrate the effect of changing the subjective value of years until use:

Assume:

Holding cost	=	.25
Value of units	=	$100,000
Years until use	=	3.5

.25 X $100,000 X 3.5 = $87,500

If the cost to terminate was less than $87,500, it would make fiscal sense to terminate.

Suppose:

Holding cost	=	.25
Value of units	=	$100,000
Years until use	=	7

.25 X $100,000 X 7 = $175,000

In this situation, if the cost to terminate was less than $175,000, it would make fiscal sense to terminate.

As the above examples illustrate, the only change is in the expected time until use, yet a large dollar difference occurs. A straightforward linear function, but one that both IMs and their supervisors must be aware of in order to make the best business decision concerning continuing or terminating a contract.

In conclusion, the researcher feels that a more accurate variable cost to hold could be achieved if the aforementioned recommendations are followed. Instead of using a constant 21% in the termination model, two different values would be produced, and most likely both would be greater than the present 21% due to using both a more realistic time value of money as well as an adjustment to the "other losses" category for consumable items. How much greater would depend upon the items PLT trend and whether the item was a consumable or not.

C. COSTS INCURRED BY TERMINATING THE CONTRACT

The researcher believes that the following costs are involved when the decision to terminate a contract is made:

1. Administrative
2. Settlement
3. Navy Stock Fund surcharge
4. Termination Inventory
5. Disposal
6. Goodwill
7. Potential reprocurement
8. Inflation
9. Production base
10. Item migration

Each of the ten costs above will be discussed in detail in this section.

The first cost to be looked at is the additional administrative costs incurred due to contract termination. In the Air Force's termination model, a flat $250 is charged. In NAVSUP's tentative termination model, $2,000 is charged. Both of these costs consider only the parent Service's costs and not the labor and material used by the TCO and associated personnel from the cognizant DCASR.

Of importance to making the best decision concerning whether to terminate or not, is an understanding of how administrative costs are funded by NAVSUP. NAVSUP has recently begun funding its' field activities, of which SPCC is one, using a budget execution process called PURS

(Productive Unit Resourcing System).[10] Using PURS, NAVSUP funds its' activities Operation and Maintenance (O&M) requirements on the basis of actual work performed, as opposed to funding based upon the costs which were previously incurred, as was previously done. The PURS divides procurement functions into the following categories:

1. Actual buying,
2. Contract administration, and
3. Procurement overhead.

Nowhere in the instruction are any details provided as to how the administrative costs involved in a contract termination are reimbursed to the field activity.

During the researcher's thesis travel to NAVSUP, discussions concerning this point were held with the cognizant personnel in both the financial (NAVSUP 012) and contracting (NAVSUP 02) divisions. No detailed records documenting the additional administrative costs of terminations had been presented to NAVSUP to date. It was felt, by personnel contacted at NAVSUP, that these costs would be reflected in a rapidly increasing percentage of time and effort showing up in the contract administration segment of the PURS figures. Unfortunately, the figures submitted by SPCC to NAVSUP, as required by PURS, do not reflect this. The following figures, broken down by size of procurement,

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[10]NAVSUPINST 7000.21A dated 12 DEC 1986 is the current instruction which governs the management of this system.

indicate what SPCC has reported over the past three fiscal years as its percentage of productive hours spent on contract administration: [Ref. 52]

	SPCC	
	Large	Small
FY85	19%	19%
FY86	21%	21%
FY87	22%	23%

Even should SPCC's contract administration figures continue to increase, the funds available for distribution through PURS as a whole are being adversely affected by the current austere budgets. The change in funding of the entire PURS budget at NAVSUP between fiscal years 1987 and 1988 reflected a decrease of five percent. Between fiscal years 1988 and 1989 it is estimated that an additional ten percent will be cut from the already reduced level of PURS funding. [Ref. 52]

One of the TCO's from DCASR Chicago has recommended that the termination be treated as a contract modification. She estimated that the average modification costs only $350 as compared to the Navy's $2,000 [Ref. 53]. In addition to this drastic dollar difference, the "color" of money used is different. Navy operational funds would be used if the Navy terminated while DLA operational funds would be used if they issued the modification while in their role as ACO. Additional research will be required into statute, regulation and case law to see if indeed this is a viable option to be pursued. It is the researcher's opinion that in this era of

decreasing operational dollars, the Navy should investigate opportunities such as this. Although some of the Navy's money would still be used to reflect the IM's time and effort required to determine whether to terminate or not, and the buyer's need to do some basic work, possibly the $2,000 could be cut in half, thereby lowering the cost to terminate.

The second cost to be considered is that of the actual settlement costs. Since most of the secondary item contracts are of the fixed-price type, FAR 49.206 is the applicable section on what process to be used. The settlement proposal itself is normally required within one year of the termination date unless the TCO authorizes an extension. FAR 49.108-7 provides for the Government assisting the prime contractor in settling his termination claims from his sub-contractors.

The two main bases for settlement proposals are the inventory basis (preferred) or the total cost basis. Another settlement method which may be used is that of settlement by determination. As stated in FAR 49.109-7(a):

> If the contractor and TCO cannot agree on a termination settlement, or if a settlement proposal is not submitted within the period required by the termination clause, the TCO shall issue a determination of the amount due consistent with the termination clause, including any cost principles incorporated by reference.

However the settlement is achieved, the dollar amount might also be called the "termination fee" as in NAVSUP's tentative termination model. This cost, divided by the original contract price for the items terminated, is plotted against

the percent of PLT completed to develop basic "rules of thumb" for NAVSUP ICPs to utilize in deciding whether to terminate or not. Two points must be remembered with respect to settlement costs; first, the settlement cost may not exceed the contract price [Ref. 33: 49.207] and second, that the TCO: [Ref. 33: 49.202(a)]

> ...shall allow profit on preparations made and work done by the contractor for the terminated portion of the contract but not on the settlement expenses. Anticipated profits and consequential damages shall not be allowed ....

The third cost is that of the effect of items in long supply on the Navy Stock Fund (NSF) surcharge. The surcharge, along with DOD's Price Stabilization Factor (PSF) (to be discussed with the eighth cost, inflation) is applied against each item's cost in order to establish the standard price which consuming units must pay. The surcharge exists as an effort for the NSF to recover from losses due to obsolescence and physical losses, as well as pay for transportation costs. As more of the "wrong" items end up in stock, the NSF surcharge must be increased to reflect the obsolescence and physical losses to be expected. As was discussed in the previous section, the Navy's UICP assumes obsolescence and losses as ten percent for repairables and twelve percent for consumables. The exact percent increase in NSF surcharge is dependent upon the percent of dollars invested in items in a long supply status relative to the total dollars of NSF items. Over time, the long supply items suffer an increasing percentage of obsolescence and physical

losses since some of this inventory never gets used or has its shelf life expire. These situations result in the requirement for an increased NSF surcharge to recover these costs incurred. By reducing the quantity of items in a long supply status by terminating contracts for items in in this status, the NSF surcharge can be maintained at its present percentage or possibly even decreased. Thus the cost here would be in fact a cost avoidance, thus encouraging more terminations of contracts for items in a long supply status.

The fourth cost is that of dollars tied up in termination inventory. The first concern of the TCO once a termination has been ordered is to have the contractor stop work, stop his sub-contractor's work, and then have the contractor identify what he believes is termination inventory. As stated by the FAR, the TCO must perform the following functions regarding termination inventory: [Ref. 33: 49.105(b)(4)]

(i) Verify its existence
(ii) Determine qualitative and quantitative allocability
(iii) Make recommendations concerning serviceability
(iv) Undertake necessary screening and redistribution
(v) Assist the contractor in accomplishing other disposition.

If, as is the norm, the TCO comes from a DCASR, DLAM 8110.1 provides detailed coverage of what the TCO is responsible for concerning termination inventory [Ref. 49: 49.105].

Costs incident to the transfer or storage of the termination inventory, including packing, crating and handling services, and transportation, are considered

settlement expenses which are normally allowable [Ref. 33: 45.608-7]. These costs should be added to the contractor's termination fees in order to more realistically know the cost to terminate.

The factor that is never addressed in a quantitative formula is how to value the costs the Navy incurs once the termination inventory is received. Elements that should be addressed include: (1) receipt, (2) creation of control numbers for incomplete parts received, (3) physical storage area taken up by these items, (4) warehousing costs, (5) physical inventory problems, and (6) ultimate disposal. While completed units can be easily accounted for and hopefully used as Government furnished material in future contracts instead of paying the contractor to make or buy these parts, this normally is not the case. Unfortunately the majority of items received will probably just take up shelf-space until a final decision is made to dispose of them.

The fifth cost element is that of disposal. There are two ways in which an item from the wholesale inventory ends up being sent to disposal. The first is as a result of the twice-a-year stratification. The second is from the running of the monthly Change Notice program. The stratification recommendations are sent to the IM prior to any actual disposal action taking place. Here the IM can interject her knowledge about the item in question that might not be shown

by running the stratification program. Unfortunately, the monthly Change Notice run is not given to the IM, as an engineering evaluation has determined that there is no further application for the item and therefore there is no need to retain the item. [Ref. 54:pp. C-1,C-2]

As far as the cost for disposal when the contract is terminated goes, the termination inventory or items no longer meeting the Navy's needs are what should be considered. DLAM 8110.1 section 49.105 describes for the TCO what the contractor should do to minimize the need for the Navy to dispose of the items. Once the TCO has determined what of the termination inventory will be offered to the Government by the contractor, the PCO and IM must decide if the Government could use any or all of it. If the Government cannot use any of the termination inventory received in an "as is" condition, then that material should be turned into the Defense Reutilization System. If the material is turned directly into the reutilization system, the costs of warehousing, cataloging, pilferage, and advertising are borne by DLA. If the Navy takes the items, the costs involved would be the same as termination inventory with the addition of documenting, rehandling, updating records and transporting the item eventually to the Defense Reutilization System. The potential costs that this disposal action would entail should be a factor added into both sides of the equation. If the contract is terminated, the cost of disposing of the

termination inventory, less the dollars recovered, should be determined. If the contract is allowed to run to it's completion, then the eventual cost of disposing of the finished items, less the dollars recovered should be determined. The appropriate value should be added to the proper side of the equation to more accurately reflect the cost of that decision.

The sixth cost is that of goodwill. Although a dollar figure might be hard to choose, it is a factor that should be included in the cost to terminate. The researcher's concern in this area is the effect of terminations for convenience on small business firms. In Reinheimer's and Melitz's thesis [Ref. 37] concerning this area, an Air Force TCO stated that problems created included: [Ref. 37:p. 32]

> ...long time delays for the process of terminating for convenience by the government, and lack of knowledge or understanding by the civilian contractors of the rules and procedures of termination for convenience.

Another Air Force TCO identified four effects on small business:

1. economic hardships due to the loss of expected cash flow;
2. the stigma of having the Government terminate one of their contracts;
3. belief that the Government is mad at them for something they either did or did not do; and
4. the massive amount of paperwork involved [Ref. 37: p.33]

The contractors interviewed expressed four specific problems. These were:

1. amount of lost time and effort due to the termination process;

2. not being allowed all overhead costs in the settlement;

3. the excessive length of time involved in the termination process; and

4. their lack of understanding of the rules and regulations governing termination for convenience [Ref. 37:p. 37]

Goodwill of the small firms, which the Navy is trying to cultivate on one hand, is lost due to the time lag and amount of paperwork involved. The Government does not allow anticipatory cash flows and does not reimburse the contractor for his time and effort required to drum up replacement business [Ref. 37:p. 37]. In times of economic hardships, contractors might be upset, but if that's the only game in town, they probably will continue to do business with the Government. When prosperity returns is the time that the effects of previously lost goodwill will most likely show up. Contractors will remember what happened to them before and avoid Government work if at all possible. Thus the loss of goodwill should be included in the cost to terminate a contract, but the mechanism to do so consistently will be difficult to create.

The seventh cost is that of potential reprocurement. As was pointed out when discussing the cost to continue a contract, the appropriate time until it is necessary to reprocure is a very subjective value. Costs involved here at first appear only to be those that would be incurred in any

other order. But the real cost involves not only the actual unit price, but the potential losses from quantity discounts, if any, forfeited by terminating the contract. Potential future material shortages or expected price escalations should be factors in this decision as well. Great care must be taken to ensure realism in establishing this value or the entire equation could be skewed either direction.

The eighth cost is that of inflation. While not a major factor in the past few years, this could have a substantial effect on the cost to terminate, should double digit inflation reoccur. The current Navy Stock Fund surcharge includes a factor for inflation. This factor is called DOD's Price Stabilization Factor (PSF). Since no one has a crystal ball, values for inflation being used to forecast future budgets should also be applied here. Specifically, if the item is known to be required in X years, an estimate of what its cost to procure will be then, versus what would it cost to continue the contract now is important. The difference (fully discounted to reflect present value) must be added to the cost to terminate to fully realize its effect.

The ninth cost is that of loss of the production base. Again this is a difficult cost to quantify, as the real cost does not occur now, but rather years down the line when an attempt is made to compete and either one or no bids are received. The reason this cost is a cost to terminate is that if contracts were allowed to continue, the potential

exists for companies to keep the manufacturing capability as they have some type of "track record" other than "terminated."

The tenth and last cost is that of item migration. SPCC uses different item mission essentiality codes (IMECs) to differentiate between the importance of having various items on hand. As an item gains a demand history, it might move up or down in IMEC or even be transferred from SPCC to DLA. If an item is trending upward, probably the best decision would be to continue the contract since demand is actually increasing and some of the contract's PCLT has already passed. Conversely, if the item is trending downward, the best decision would probably be to terminate since the quantity in long supply will probably only increase. If the item was actually migrating to another Service or to DLA and was currently in long supply, coordination would have to be made with the acquiring activity to see what their supply status was before taking any further action.

D. SUMMARY

This Chapter has identified some of the relevant costs which should be considered when making a decision whether to terminate a contract or not. Chapter VI will take some of the concepts and costs discussed in this Chapter and relate them to what the Navy is currently doing concerning secondary items in long supply.

VI. CURRENT NAVY EFFORTS

A. INTRODUCTION

As was previously stated in Chapter II, that for all of DOD, secondary items identified as being in "excess" grew almost 200 percent ($10.2 billion in 1981 to $29.5 billion in 1987) in a period of six years. With the increased emphasis that upper level Navy management has given to long supply, it would be reasonable to expect that changes have been made and are continuing to be made in an attempt to halt the trend of increasing items in long supply. This Chapter discusses actions in process by both NAVSUP and SPCC which address the problem of secondary items in long supply.

B. NAVAL SUPPLY SYSTEMS COMMAND'S TERMINATION MODEL

The current NAVSUP termination model is being designed so as to work on a personal computer (PC). The Navy Fleet Material Support Office (FMSO), the control activity for and resident experts on the UICP, has been tasked by NAVSUP to provide the programming expertise needed to create the necessary software to run NAVSUP's termination model on the PC. In addition to programming the PC, FMSO has been directed by NAVSUP to include the models methodology in the UICP itself by including it in Functional Description PD84 during the UICP's resystemization.

NAVSUP's PC termination model is based upon the concepts SDR uses to make a recommendation to terminate. The first filter that NAVSUP has used in their model is a $10,000 threshold value of contracts recommended for termination. If the item passes this filter, a manual input of contractor proposed termination fees must be entered before any other computations can be conducted. The model itself is the same basic attempt as Chapter V was addressing, a simple economic cost-benefit analysis of the cost to continue the contract versus the cost to terminate the contract. The termination equation is presented below with the left side of the equation being the cost to continue and the right side of the equation being the cost to terminate:

$(I \times R \times HP_I) + (S \times Q_T \times HP_S) + (O \times Q_T \times HP_O)$ vs CTF + ADM + $(F \times \text{Min}\{Q, Q_T\} \times HP_F)$

1. Cost to continue

NAVSUP's model uses three independent terms in order to derive the cost to continue the contract. The first term is the investment cost which is determined using the following formula:

$$I \times R \times HP_I$$

Where

I = interest rate (.10 annual, or .025 per quarter as used in this equation)
R = dollars and dollar value of material which potentially would be returned by the contractor to the Navy after termination[11]
HP = average length of time that the stock of excess material will be held before it is used (how long it will take until the funds invested will be recovered), in quarters
$= T_{RL} + ALT$

Where

T_{RL} = estimated time to reach reorder level after termination, in quarters
ALT = administrative lead time, in quarters

All of the quantities above are subject to uncertainty as to how values should be obtained for them. The R figure will have to be the estimate which either the PCO or TCO derive once the contractor's estimated termination costs (termed contractor termination fees, CTF, in the cost to terminate segment of the equation) are known. In the researcher's opinion, there exists no motivation in the termination process for the contractor to estimate his fees in a realistic manner. If his proposed termination fees are higher then the eventual settlement, the R value will have been set too low. This low dollar value will artificially lessen the cost to continue while artificially inflating the cost to terminate. The next quantity, HP_I, is another estimate, this time the value is estimated by the IM. It is

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[11]For purposes of this equation, the value R reflects the difference in dollars between the awarded contract price and the unrecoverable costs (plus a reasonable profit) already incurred by the contractor. This difference, in dollars, represents the forgone opportunities of other usage of these funds.

the researcher's opinion that this value might be estimated to be lower than it eventually turns out to be. The reason for this is that the IM would not want to have a large value of HP_I, as this might lead her supervisor into more indepth reviews of other decisions the IM makes. Although the researcher has no evidence that this does indeed occur, the basic human behavior of conflict avoidance would support this view. If this were to hold true, a smaller than actual HP_I would lessen the investment cost to continue. In summary, the investment cost element will probably result in an understated value for the cost to continue the contract.

Next we examine the total storage cost, assuming that the contract is continued. This value is determined by:

$$S \times Q_T \times HP_S$$

Where

S = storage rate (.01 annual, or .0025 per quarter as used in this equation)

Q_T = total dollar value of termination quantity

HP_S = average length of time that the stock of excess material will be stored before it is used, in quarters

$= T_{RL} + PDLT_e + ALT$

Where

T_{RL} = estimated time to reach reorder level after termination, in quarters

$PDLT_e$ = elapsed production lead time (difference between current julian date and contract award julian date in quarters)

ALT = administrative lead time, in quarters

The Q_T value is a factual matter which is not subject to tinkering by either the TCO or contractor to any great extent as it is determined by comparing the quantity to be

terminated to the total contract price. Q_T normally is determined simply by dividing the total contract price by the total items called for in the contract, then multiplying this unit price by the quantity terminated. The only major factor which would have to be looked at on a case-by-case basis is that of the contractor's set-up costs and how they were depreciated.

The HP_S value again is a subjective, best guess value. If it is set low, the cost to continue would be lowered, thus less contracts would be processed for termination.

One term which the researcher believes should be included in this cost area is that of the added costs associated with the storage of shelf life and hazardous materials. The model at present fails to address the added costs of these circumstances.

The last term in the cost to continue segment is that of obsolescence. The present termination model determines the obsolescence value by using the following formula:

$$O \times Q_T \times HP_O$$

Where

O = obsolescence rate (.10 annual, or .025 per quarter as is used in this equation)
Q_T = total dollar value of termination quantity
HP_O = average length of time that the stock of excess material will be stored before it is used or becomes obsolete
$= T_{RL} + PDLT_e$

Where

T_{RL} = estimated time to reach reorder level after termination, in quarters
$PDLT_e$ = elapsed production lead time (difference between current julian date and contract award julian date, in quarters)

As was discussed in Chapter V, the researcher believes that this segment would be the ideal location to add in the additional two percent "other losses" value for consumable items.

Since the Q_T value here is the same as for the storage rate, the same logic applies to this figure.

The HP_O value is another subjective value. In these days of rapid technological breakthroughs in various electronic fields, what originally was believed to be able to survive for ten years might end up being replaced in two years by a cheaper, more capable item. The IM, along with various other Weapon Systems Group personnel must think thoroughly before an arbitrary value is assigned, due to the impact this value has on the cost to continue segment.

2. Cost to terminate

The cost to terminate in the Navy's model also is comprised of three separate terms, which when added together give a specific dollar value as the cost to terminate. This value can then be compared to the cost to continue. If the cost to continue is higher than the cost to terminate, the economic decision should be to terminate.

The first value is simply that of CTF, contractor termination fees. This value is provided by the contractor.

Again the researcher believes that there is no real benefit for the contractor to be "realistic", as this might adversely affect their ability to negotiate a settlement value which is acceptable. The higher the value of CTF, the lower the resulting R value. This higher CTF value makes it appear more expensive to terminate then is really the case after a termination settlement is finally reached.

The second term is that of ADM, administrative cost to terminate a contract ($2,000 in the Navy's model). As was discussed in Chapter V, the Air Force uses $250 in their termination model while a DCASR TCO input indicated that $350 would be appropriate if the termination was handled as a contract modification. The following costs for SPCC to award a contract (which should be approximately the same as to terminate a contract) are listed in priority order of use and dollar value it costs: [Ref. 27]

	9-83	9-84	9-85	9-86	Est. 9-87
Purchase Orders	$230	$390	$660	$660	$660
Delivery Orders	230	390	660	660	660
Negotiated Contracts	900	1080	1940	1940	2027
Advertised Contracts	930	1110	1970	1970	1700

Thus while the most frequently used contract types, purchase orders and delivery orders, only cost $660, the NAVSUP model still uses the flat $2,000 value.

The researcher believes that the ADM term could more accurately reflect the actual costs involved if more weight was given to the vast majority of contracts which are processed at a cost of $660/contract. If further research

shows that the DCASR recommended use of contract modifications, at $350/modification, could accomplish the majority of terminations, at that time a weighted average could be used to arrive at a more realistic ADM value. Either way, it appears that NAVSUP's current value for ADM of $2,000/contract is too high and should be lowered to more accurately reflect the actual costs incurred.

The last term attempts to account for inflation on future purchases. This term is given by the following formula:

$$F \times \text{Min}(Q \text{ or } Q_T) \times HP_F$$

Where

F = inflation rate (.04 annual, or .01 per quarter as used in this equation)
Q = dollar value of the economic order quantity (EOQ)
Q_T = total dollar value of termination quantity
HP_F = average length of time that the stock of excess material will be held before it is used considering the effects of inflation, in quarters
= $T_{RL} + PDLT_e + ALT$

Where

T_{RL} = estimated time to reach reorder level after termination, in quarters
$PDLT_e$ = elapsed production lead time (difference between current julian date and contract award julian date, in quarters)
ALT = administrative lead time, in quarters

Although F, the inflation rate, is only an estimate, as long as it reflects the current administrative estimates, the entire value of this third term should provide a useful input.

One specific constraint set by NAVSUP on HP_F, is that when that value is greater than 20 years, the inflation factor (F) is set to zero. This results in the entire inflation value of the equation becoming zero so that only CTF and ADM will have any effect on the equation.

3. Input requirements for the termination model

A potential problem with this model is the amount of input required of the IM. As there are only 150 IMs to cover the approximately 500,000 items managed by SPCC, every moment of the IM's time is valuable. Unless the following "laundry list" of required IM inputs is lessened, or automated, this proposed NAVSUP termination model will probably be pushed aside in order to take care of the most pressing issues (at that time). The following inputs must be made by the IM for each individual item considered for termination:

1. total dollar value of termination quantity
2. termination quantity
3. termination fees
4. administrative lead time
5. production lead time
6. procurement lead time
7. contract award date (julian)
8. current julian date
9. on hand RFI assets
10. on hand NRFI assets
11. due in assets (including long supply material)

12. survival rate
13. reorder level
14. total PPRs over procurement lead time
15. dollar value EOQ
16. backorders
17. due out
18. quarterly demand forecast quantity
19. quarterly regenerations forecast quantity

These required inputs are rife with the potential for communication breakdowns as the IM does not maintain all this information. Somehow the IM would have to let other people know what she requires and get the proper reply in a timely fashion in order to use this model.

Until a track record is established and "rules of thumb" are derived, attempting to quantify the required inputs will involve a lot of guesswork.

The implications of the various "what ifs" were discussed when explaining how each term of the NAVSUP termination model was used. The researcher's recommended changes to the individual terms of the equation might correct some problems with this model, but coming up with a specific dollar "savings" or "cost" might be hard to support due to its subjective sources. As in any business decision, the best business decision should be made regardless of what the model's final dollar figure is due to the model's reliance upon many subjective values. This is the point that many

auditors appear to overlook. The world of budgeting and inventory requirements determination is full of potential pitfalls (in this case improper subjective values), and the more time that the IM spends looking over her shoulder the greater the potential for falling into another unseen trap.

4. Summary

In summary, the NAVSUP termination model is a good first attempt at trying to do what GAO has been asking for: actually comparing the cost to hold versus the cost to terminate items in long supply. Unfortunately, many of the inputs to this model are subjective and therefore hard to substantiate to an auditor who has the ability to confront the Navy with knowledge obtained through 20/20 hindsight.

If this model is ultimately included in the UICP, hopefully the amount of input required of the IM will drop substantially. Otherwise IMs will continue to use this model only while management's interest in items in long supply is high and will allow the model to be forgotten with the next crisis.

C. NAVY SHIPS PARTS CONTROL CENTER TERMINATION CRITERIA

SPCC has taken an aggressive approach towards reducing the number of items which are allowed to remain on order while in a long supply condition. Appendix C describes in detail the actual termination procedures which the IMs are currently using. The first requirement that must be met prior to using SPCC's termination procedures is that the

dollar value of excess material for the item in question must exceed $10,000. Although not clearly stated in SPCC's procedure, the $10,000 figure which must be exceeded prior to any action being taken was not arbitrarily established. Personnel at SPCC examined cases where stratification was identifying excesses and noted that first, only 1.3% of the total contract dollars at SPCC came from contracts valued at less than $10,000. Secondly, a review of all contract actions revealed that 69.8% of SPCC's total contract actions were for contracts valued at less than $10,000. The third factor looked at was SDR "churn." The concern here was that by terminating contracts with total values less than $10,000, requirements would change between SDRs and the IMs would be ordering and cancelling the same item, time after time. [Ref. 27]

Once the $10,000 dollar value of excess material had been established, the termination work group, which was comprised of members from all affected codes at SPCC, worked together to ensure the problem of items in long supply continued to be treated as an actual problem and not just paid "lip service" as other programs in the Navy have been in the past. The effort to gain the upper hand on items in long supply can be seen by the following statistics on DT (Due-in Termination) cards that were processed through SPCC Code 025 (contract administration division):

Year	# of DT cards processed
1985	2
1986	190
1987	683
1988 (mid Feb)	762

Appendix D illustrates two of SPCC's contracting department's efforts to better control the termination process.

The extent of the long supply problem at SPCC was cited by the GAO in their January 1988 report on the Navy [Ref. 1]. In this report it was noted that items estimated to be in long supply were as follows (dollars in millions): [Ref. 1:p. 15]

Type of Material	Fiscal Year		
	1986	1987	1988
Consumable	$757.9	1,158.9	1,239.6
Repairable	$3,731.2	3,941.1	4,018.2

While the amounts are indeed large, the researcher believes the trend is more important. For consumables, there was a $401 million increase between 1986 and 1987 while only a $80.7 million increase is projected between 1987 and 1988. This is a drop from the 52.9% increase between 1986 and 1987 to approximately 7% between 1987 and 1988. The repairables as well show this trend, a $209.9 million increase between 1986 and 1987 as compared to $77.1 million estimated between 1987 and 1988. In percentages, from a 5.6% increase from 1986 to 1987 to approximately a 2% increase estimated between 1987 and 1988.

Looking at the actual stratification values, once again a decreasing trend is seen:

Consum. ($000)	SEP82	SEP83	SEP84	SEP85	SEP86	SEP87
DILS	45,811	83,259	143,578	150,214	118,384	100,121
%	8.4	14.6	20.1	18.6	16.1	13.7
Repair. ($000)						
DILS	126,946	252,360	268,294	444,575	245,978	229,042
%	14.9	20.9	18.7	20.2	12.9	11.5

note DILS = contracts due in long supply
% = $ total DILS contracts/ $ total contracts

NAVSUP has set goals of 8% DILS for consumable items and 7% DILS for repairable items. As can be seen from the above figures, SPCC is working aggressively to achieve these goals.

As the fiscal faucets were opened in the early 1980's after the "decade of neglect," many items were finally procured. Unfortunately the items bought included items which ultimately entered a long supply condition. Before SPCC should be harshly condemned for buying the wrong items, the system (wholesale) material availability (SMA) should be examined. In September 1980, the consumable items' SMA was approximately 75%. In September 1987, the consumable items' SMA was approximately 86%. In April 1981, the repairable items' SMA was approximately 55%. In April 1987, the repairable items SMA was approximately 82%. Throughout all time periods discussed, the SMA goal had remained a consistent 85%. Thus part of the cost of achieving a higher SMA appears to have been an increase in items in long supply. As the Navy has been involved in extensive "show the flag"

evolutions during this time period, one must wonder what both the public and official outcry would have been if Navy ships and/or aircraft could not have completed their missions because of a lack of proper spare parts. It is the researcher's opinion that as austerity affects DOD's budgets, once again SMA will drop, but hopefully not as much as in the 1970's.

D. NEW INVENTORY POLICY

SPCC in June 1987 revised its reordering policy in order to take advantage of both item demand trends and quantity price discounts while continuing to operate in a constrained financial and personnel environment. In order to address GAO's opinion that a blanket twelve-month order quantity was not efficient, this new minimum EOQ policy was established. Since DOD Instruction 4140.39 [Ref. 50] specifies that no order quantity will be less than 3-months demand or more than 3-years demand, SPCC has established the following as its reorder policy: [Ref. 1:p. 27]

Category of Constraint	Characteristics	Minimum Order Quantity
I	Very stable, predictable demand, relatively low cost	8 or 10 quarters
II	Stable, predictable demand, low to moderate cost	4 quarters
III	No well-established demand pattern and/or very high cost	No minimum constraint, normal ICP EOQ rules

The intention of this policy is to minimize the procurement of items which are trending either way or are very expensive. The researcher believes that this policy will assist SPCC in reducing its DILS and actual long supply dollars by not tying up large dollar amounts for items which might not be useful in the future.

E. POTENTIAL SYSTEMS

SPCC is currently reviewing other methods by which it can improve its ordering process. The three which will briefly be discussed in this section are: (1) Project Q-Star, (2) BIDNET, and (3) Rapid Acquisition of Manufacturing Parts (RAMP).

1. Project Q-Star

For individuals not familiar with inventory management terminology, the symbol Q* is given to that quantity of items which is optimum to order. The SPCC project named Q-Star was designed to create an evaluation procedure for bids where quantity discounts and varying amounts of lead time apply. The Air Force has had a similar program since the late 1970's and apparently has had no major problems with industries' acceptance of it. [Ref. 55]

The Logistics Management Institute (LMI), issued a report [Ref. 18] on PCLT which was quite critical of the poor communication between the inventory managers and the procurement managers. LMI reported that DOD provided few incentives to reduce PCLT and had made no effort to integrate

the objectives of both inventory and procurement management. Another fault reported was that the "cost" of the item was in fact procurement dollar oriented only, with no analysis being done to determine "the total cost" (procurement and ordering costs as well as PCLT involved) of the item. LMI also recommended that DOD develop trade-off models to compare PCLT with price in order to determine the best buy. [Ref. 18]

Q-Star is SPCC's first real effort at developing a trade-off model to look at price, quantity and PCLT. The present UICP uses fixed price and PCLT values when computing EOQ. This results in the total variable costs (TVCs) only being minimized for that specific instance. Project Q-Star hopes to determine the "optimal order size" by taking different inputs from both PCLT and price. The items which hold a high potential for Q-Star usage are those consumable items which have a high, strong and steady demand history. It has been estimated that approximately 2,000 items at SPCC are potential candidates [Ref. 55].

Once an item has been determined to be a potential candidate, a bid range is set so as to be included in the request for proposal. This bid range is for one to twelve quarters of demand plus the current material requirement. From this stage, the proposals received are reviewed to determine the price, quantity and lead time combination that represents the least total relevant cost to the Navy. In this case total relevant costs consist of the sum of: (1)

annual total variable costs, (2) investment opportunity costs, and (3) costs of the current material requirement. [Ref. 55]

Since July 1986 only six or seven contracts have been awarded using the Q-Star technique. After discussions with its creator, John Boyarski, the researcher was left with the feeling that this is a project which has been given insufficient emphasis at SPCC. The major stumbling block appears to be the unfamiliarity and distrust of procurement personnel with anything new when PURS is based upon the tried and true methods of old. If this system was more fully used, long supply problems might be substantially reduced. Better usage of funds and less likelihood of a need to terminate a procurement contract are probable results of fully implementing this project.

2. BIDNET

SPCC, through its contracting department, is currently conducting a test to determine the benefit of distributing solicitations through commercial networks, in this case through BIDNET. BIDNET is a company of The Dun & Bradstreet Corporation. This test is being conducted using an established base of several thousand companies. When these companies sign up with BIDNET for the SPCC/BIDNET Express Distribution Network, they indicate what type of products they are interested in bidding on. As the test is presently being conducted, a "Bid Alert" is electronically

transmitted to the company. The "Bid Alert" notifies the company of a potential contract they might be interested in bidding on. If the company desires the entire Request for Quotation, they can have BIDNET send them the package within 48 hours for a fixed fee, or they can request by letter that SPCC send them a package. Either way, SPCC's cost to advertise is reduced significantly. This in turn lowers the administrative order cost term of the EOQ model, making the order quantity (Q) smaller and thereby reducing the risk of the item becoming long supply. The next logical step is to make fuller usage of electronic bulletin boards to obtain both increased competition for normal procurements as well as the potential for actually competing emergent requirements which are normally procured on a sole source basis. [Ref. 56]

3. Improved Manufacturing Flexibility

The Navy has just recently brought on-line its latest effort towards improving both equipment down-time and parts availability. This effort is called Rapid Acquisition of Manufactured Parts (RAMP). This program's objective is to "reduce the Navy's spare parts supply and procurement problems by fabricating parts in small quantities, on short notice and at a reasonable cost." [Ref 57:p. 6] RAMP depends upon significantly reducing PCLT so that rather than stocking large quantities of items to provide for safety stock, lead time demand stock and variability of demand, an

attempt is made to use "just in time" inventory management. RAMP also involves the electronic transfer of digitized data, just as BIDNET electronically transfers requirements. A more detailed look at RAMP may be gained through the reading of Darby's thesis on this subject [Ref. 57].

F. SUMMARY

This chapter has reviewed what NAVSUP and SPCC have done in an attempt to stem the rising number of items in long supply. The chapter also discussed the actions the Navy is currently taking to improve its inventory management system so that items need not be ordered several years in advance of the requirement and in inflated quantities. Chapter VII describes the recommended decision making mechanism concerning the actions which should be taken when secondary items are in long supply.

VII. DECISION-MAKING MODEL

A. INTRODUCTION

After the problems identified in Chapter VI with what NAVSUP and SPCC have done in an attempt to stem the rising number of items in long supply, it is only reasonable to expect an alternative to be offered. This chapter will present the researcher's recommended decision-making model and will compare it to the existing SPCC termination criteria.

B. RESEARCHER'S MODEL

The model that follows is described via flow charts and narrative. The following section contains a step-by-step narrative description of how the model can be used. The second section contains the flow charts that comprise the model.

This model is presently configured solely for consumable items at SPCC (not ASO). The model also uses the $10,000 constraint from the SPCC termination criteria of Chapter VI due to its logical derivation. Two items from the FAR play a major role in this model. They are: (1) FAR 49.101(c) where contracts with excess material valued at less than $2,000 are not recommended for termination, and (2) FAR 49.101(e) which,

when terminating, gives a preference to small business over large business in continuing contracts.

The test for an item's demand trend in the model is the same as used in the current UICP. The test first computes a trend value, t, through the following equation:

t = 2 x (sum of last two observations)/ (sum of last four observations)

At SPCC, if $t \geq 1.10$ and (last observation) $\geq$ (old average forecast), then an upward demand trend is indicated. If, on the other hand, $t \leq 0.90$ and (last observation) $\leq$ (old average forecast), a downward demand trend is indicated. Otherwise, no trend is considered to be present. These figures indicate that SPCC is quite sensitive to demand variation. ASO, due to having a higher average unit cost, does not allow for an upward trend unless $t \geq 1.50$ and a downward trend if $t \leq 0.99$. Thus ASO is quick to catch a downward trend and so saves procurement dollars. In addition ASO is slow to detect upward trends, again saving procurement dollars. [Ref. 24:pp. 3-A-29, 3-A-30]

NOTE: Throughout the following steps it is important to realize that when the phrase "go to step 15" appears, the quantity in question is to be terminated. Starting with step 15, the only question is what method of termination is appropriate.

Step 1

Item is identified as being in excess. There are three ways in which this can be determined:

1. SDR--Based on Net Asset Position being positive: [Ref. 13:Encl. 1 p.1]

Assets	Requirements
OH (On-hand)	Reorder level (Lead Time Demand + Safety Level)
Due on Purchase Request	AWR (Acquisition War Reserves)
Due on Contract	Backorders
Other Due	Due Out
	Planned Program Requirements (PPRs) within PCLT
Total Assets	Total Requirements

2. Stratification--Based upon determination of the retention limit. This is based upon a summation of the following categories: [Ref. 24:p. 3-55]

Reorder level (LTD + SL)
Backorders
PPR's
Mobilization Requirements
Recurring demand forecasts through budget year
Order quantity
Economic retention quantity
Contingency retention objective
Approved acquisition objective
Approved force retention quantity

If assets (on-hand and due-in) exceed this retention limit, they are potential excess quantities.

3. Manual--information is received by the IM that would drastically change an item's status. Examples might be equipment overhauls, weapon system termination, program stretchout, item migration to other branches of the services or DLA, major operational tempo decrease due to funding constraints, or even being obsolete due to new technology.

Ensure files (both the Master Data File, MDF, and the Due-in/Due-out File) are updated as necessary before proceeding further. The IM must input her knowledge of the item which is not reflected in these files to ensure an accurate "picture" of the item's status is obtained. Potential inputs include: placing the material in the correct

material condition code, looking at past CSSR's to see if PPR's were accidentally "browsed" out, and checking to ensure all planned outfittings are included. If the item is still in an excess position after the files have been updated, go to step 2.

Step 2

Are there any outstanding procurement actions (either purchase requests or contracts for the remainder of this model)?

-- if no, STOP, as there are no outstanding contracts.

-- if yes, go to step 3.

Step 3

Compute the dollar value of the excess material: Quantity in excess x replacement price. Then go to step 4.

Step 4

Is the excess the result of a Life-of-Type (LOT) buy? LOT buy is a one time procurement of sufficient quantity to meet all demands through the items useful life. The preferred situation for LOT buys would be that a "flag" would be turned on for the item in the Master Data File (MDF) so that SDR would not do an excess computation on the item. But, unless this flag is applied 100% of the time, and only to the correct items, this added step in logic might prevent accidentally terminating a LOT buy.

-- if no, go to step 4a.

-- if yes, STOP, continue procurement actions.

Step 4a

Are applicable weapon systems in use by the U.S. military services (active or reserve) or by foreign governments?

-- if no, go to step 15.

-- if yes, go to step 5.

Step 5

Is the item itself obsolete? The definition of obsolete used in this model is similar to that of functional obsolescence in Black's Law Dictionary [Ref. 58].

> obsolete--the state in which an item needs replacement because its parent structure or equipment has become inefficient or out-moded because of improvements developed since its original construction or production [Ref. 58:p. 606]. An item can be obsolete to the Active Navy, Reserve Navy, and/or foreign governments having this weapon system.

-- if no, go to step 6.

-- if yes, go to step 100.

Step 6

Was the procurement action under examination for potential termination based upon a defective, faulty or imperfect specification rendering the item unusable for its original purpose? The IM will obtain this information by one or both of the following methods. First, either the end user (in the case of filling backorders) or the receiving personnel at a stock point (in normal situations) might detect and report a problem with the items form, fit, or function. The second method is that of communications

received from the technical personnel at either the ICP, the appropriate Systems Headquarters, or even from the contractor himself concerning problems or potential problems with the specification.

-- if no, go to step 7.

-- if yes, go to step 15.

Step 7

Has there been a change since the last SDR in the applicable engineering support method to be used for this item? (From repairable to consumable, from field level repair to depot repair, etc.)

-- if no, go to step 8.

-- if yes, go to step 12.

Step 8

Has there been a change in funded PPRs since the last SDR?

-- if no, go to step 9.

-- if yes, go to step 20.

Step 9

Was this item procured under a SAIP (Spares Acquisition Integrated with Production) program?

-- if no, go to step 10.

-- if yes, go to step 20.

Step 10

Is the dollar value of the excess > $2,000? This value

is used due to FAR 49.101(c) which recommends that contracts less than $2,000 should normally not be terminated.

-- if no, STOP. Continue procurement actions

-- if yes, go to step 50.

Step 12

Will the applicable Hardware Systems Command buy the item from the Navy Stock Fund?

-- if no, go to step 15.

-- if yes, STOP. Continue procurement action.

Step 15

Cancel all purchase requests, then go to step 16.

Step 16

Any open contracts?

-- if no, STOP.

-- if yes, go to step 17.

Step 17

Is a no cost settlement acceptable to the applicable contractor?

-- if no, go to step 18.

-- if yes, issue no cost settlement, then STOP.

Step 18

Can the contract be terminated for default?

-- if no, issue termination for convenience, then STOP.

-- if yes, issue termination for default, then STOP.

Step 20

Was the weapon system the item was used in deleted, retired or otherwise removed from the Navy's and other services' inventories?

-- if no, go to step 25.

-- if yes, go to step 21.

Step 21

Are there any other weapon system applications for this item?

-- if no, go to step 15.

-- if yes, go to step 28.

Step 25

Did the item's program suffer a major delay?

-- if no, go to step 30.

-- if yes, go to step 26.

Step 26

Was the program slippage longer than the items PCLT?

-- if no, go to step 28.

-- if yes, go to step 27.

Step 27

Are proposed contractor termination fees greater than 50% of contract value?

-- if no, go to step 15.

-- if yes, go to step 28.

Step 28

Is the item's IMEC (Item Mission Essentiality Code) 3 or 4?

-- if no, go to step 32.

-- if yes, go to step 200.

Step 30

Was the item's applicable program reduced?

-- if no, go to step 28.

-- if yes, go to step 31.

Step 31

Are items in excess of the new total requirement plus expected demand during PCLT?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 28.

Step 32

Is the dollar value of the excess > $2,000?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 55.

Step 50

Is the item's IMEC 3 or 4?

-- if no, go to step 55.

-- if yes, go to step 200.

Step 55

Is the item's demand trending upward?

-- if no, go to step 56.

-- if yes, go to step 250.

Step 56

Is the dollar value of the excess being procured > $2,000?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 57.

Step 57

Are there any outstanding purchase requests?

-- if no, go to step 60.

-- if yes, go to step 58.

Step 58

Terminate purchase requests until:

-- no excess remains, STOP.

-- all purchase requests terminated, go to step 60.

Step 60

Is the dollar value of the excess $\leq$ $10,000?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 61.

Step 61

Initiate partial or complete terminations of contracts until all excess is eliminated or until all contracts have been terminated. Then STOP.

Step 100

Is there a commercial alternative which would fulfill form, fit and function of obsolete item?

-- if no, go to step 301.

-- if yes, go to step 101.

Step 101

Compute new requirements using the commercial alternative's PCLT. Compare the on-order quantity to the new requirement.

-- on-order > new requirement, go to step 15. Note: if new requirements are greater than zero, the IM must order new items.

-- on-order $\leq$ new requirement, STOP. Note: it is highly unlikely that an item will end up here. This is because SDR "said" item was in a long supply status, yet now the on-order quantity is less than the new requirement. The IM needs to find out why this is so. The three choices for action to be taken, depending upon that the IM determines, are: (1) terminate the contract, (2) consolidate stock to a minimum number of stock points, and (3) leave the order as is.

Step 200

Is the item's demand trending upward?

-- if no, go to step 201.

-- if yes, go to step 250.

Step 201

Is the item's demand trending downward?

-- if no, go to step 210.

-- if yes, go to step 202.

Step 202

Terminate purchase requests until:

-- no excess remains, STOP.

-- all purchase requests are terminated, go to step 203.

Step 203

Is the item's unit price > $2,000?

-- if no, go to step 204.

-- if yes, go to step 205.

Step 204

Terminate all contracts except for one item from the contract with earliest required delivery date (RDD), favor small business over large business for continuing, then STOP.

Step 205

Partially or completely terminate contracts until the excess is < $2,000. Favor small over large business. Cancel contracts with farthest RDD's first.

Step 210

Can the item be used as Government Furnished Material on parent equipment contracts presently outstanding or nearing award?

-- if no, go to step 211.

-- if yes, go to step 225.

Step 211

Is the dollar value of the excess $\leq$ $10,000?

-- if no, go to step 212.

-- if yes, STOP. Continue procurement actions.

Step 212

Are any purchase requests for the item outstanding?

-- if no, go to step 214.

-- if yes, go to step 213.

Step 213

Terminate purchase requests until:

-- no excess remains, STOP.

-- all purchase requests terminated, go to step 214.

Step 214

Is the dollar value of the remaining excess $\leq$ $50,000?

-- if no, go to step 215.

-- if yes, STOP. Continue remaining procurement actions.

Step 215

Partially or completely terminate contracts until all excess is eliminated or until all contracts have been terminated, then STOP. Favor small over large business. Cancel contracts with farthest RDD's first.

Step 225

Issue modification to present equipment contract(s) to reflect item being provided as Government Furnished Material vice Contractor Furnished Material, then:

-- no excess remains, STOP. Continue procurement actions.

-- all excess items remaining, go to step 211.

Step 250

Does the item have a shelf life or is it hazardous material?

-- if no, go to step 260.

-- if yes, go to step 251.

Step 251

Is the item hazardous material?

-- if no, go to step 252.

-- if yes, go to step 326.

Step 252

Check with technical personnel and/or review the last CSSR received to ascertain probable cause for change in demand:

-- if aberration, go to step 253.

-- if not an aberration, go to step 254.

Step 253

Align computed requirements to RDD's of outstanding procurement actions, then go to step 360.

Step 254

Update the Quarterly Systems Demand Forecast (UICP application B074) to reflect the new demand and PPR's requiring adjustments. Data elements requiring updates might include new lead time values, known upcoming ship deployments, change in IMEC, or change in unit price. Then go to step 255.

Step 255

Recompute assets to requirements. Is the item still in a long supply situation?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 256.

Step 256

Align newly computed requirements to RDD's of outstanding procurement actions, then go to step 257.

Step 257

Identify items to requirement, by date. Partially or completely cancel purchase requests or terminate contracts until no excess remains, then STOP.

Step 260

Check with technical personnel and/or review the last CSSR received to ascertain probable cause for change in demand.

-- if aberration, go to step 56.

-- if not an aberration, go to step 261.

Step 261

Update the Quarterly Systems Demand Forecast (UICP application B074) to reflect the new demand and PPR's requiring adjustments. Data elements requiring updates might include new lead time values, known upcoming ship deployments, change in IMEC, or change in unit price. Then go to step 262.

Step 262

Recompute assets to requirements. Is the item still in a long supply status?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 56.

Step 301

Does the item have a shelf life or is it hazardous material?

-- if no, go to step 305.

-- if yes, go to step 302.

Step 302

Is the item hazardous material?

-- if no, go to step 303.

-- if yes, go to step 325.

Step 303

Is the item's IMEC 3 or 4?

-- if no, go to step 350.

-- if yes, go to step 300.

Step 305

Is the dollar value of the excess > $2,000?

-- if no, STOP. Continue procurement actions.

-- if yes, go to step 306.

Step 306

Is the item's IMEC 3 or 4?

-- if no, go to step 307.

-- if yes, go to step 200.

Step 307

Terminate purchase requests until excess is gone or until all purchase requests are terminated. No excess?

-- if no, go to step 308.

-- if yes, STOP.

Step 308

Is the unit price > $2,000?

-- if no, go to step 309.

-- if yes, go to step 310.

Step 309

Terminate contracts with RDD's farthest from present date until excess is > $2,000, then STOP.

Step 310

Terminate all contracts with the exception of 1 unit or unit pack. The item saved should be from the contract with the closest, firm RDD. Then STOP.

Step 325

Is the item's IMEC 3 or 4?

-- if no, go to step 340.

-- if yes, go to step 326.

Step 326

Can the average customer wait time standard be met by one stock point on each coast?

-- if no, go to step 335.

-- if yes, go to step 327.

Step 327

Are existing hazardous material storage areas available in adequate size for stocking at a single stock point on each coast?

-- if no, go to step 335.

-- if yes, go to step 328.

Step 328

Consolidate inventory at one activity per coast to maximize bin closings at NSC's. Then go to step 329.

Step 329

Is the dollar value of the excess $\leq$ $10,000?

-- if no, go to step 331.

-- if yes, go to step 330.

Step 330

STOP. Continue all procurement actions. Modify contracts and purchase requests to reflect new delivery points.

Step 331

Are there any purchase requests outstanding?

-- if no, go to step 333.

-- if yes, go to step 332.

Step 332

Terminate purchase requests until the excess is gone or until all purchase requests are terminated. Any excess?

-- if no, STOP.

-- if yes, go to step 333.

Step 333

Is the dollar value of the excess $\leq$ $50,000?

-- if no, go to step 215.

-- if yes, go to step 330.

Step 335

Do all stock points have adequate and proper storage facilities for the quantity in procurement which will be stored there?

-- if no, go to step 336.

-- if yes, go to step 211.

Step 336

Cancel the quantity in excess of proper storage capacity for each stock point. Cancel purchase requests first, then contracts most recently awarded until proper storage capacity constraints are met. Then STOP. Continue the procurement actions not cancelled or terminated.

Step 340

Is dollar value of excess > $2,000?

-- if no, go to step 341.

-- if yes, go to step 342.

Step 341

Are adequate and proper storage facilities available at all stock points?

-- if no, go to step 336.

-- if yes, STOP. Continue procurement actions.

Step 342

Cancel purchase requests until excess is gone or until all purchase requests cancelled. Any excess?

-- if no, STOP.

-- if yes, go to step 16.

Step 350

Compare the item's shelf life with RDD's of outstanding procurement actions.

-- if foreign government requirements only, go to step 351.

-- all others, go to step 355.

Step 351

Compute the estimated cost of disposal and holding the item. Go to step 352.

Step 352

Compute the estimated proceeds of future sales to foreign governments. Go to step 353.

Step 353

Compare the costs of disposal and holding to the proceeds of sale.

-- if result positive, go to step 15.

-- if result negative, STOP. Continue procurement actions.

Step 355

Align computed requirements to RDD's of outstanding procurement actions, then go to step 360.

Step 360

Cancel purchase requests for items which, when compared to RDDs, are anticipated to exceed their shelf life prior to projected requirements, then go to step 361.

Step 361

Is the dollar value of the excess > $2,000?

-- if no, STOP. Continue remaining procurement actions.

-- if yes, go to step 362.

Step 362

Protect the minimum of: demand during shelf life, or lead time (PCLT) demand. Any excess?

-- if no, STOP.

-- if yes, go to step 15.

Figure 7-1 is the actual flow chart which graphically illustrates how the model functions. The wording in the flow chart itself is very limited, thus if the reader has questions, referring back to the above listed steps should provide the proper answers.

C. COMPARISON OF LOGIC

In this section, a comparison is made between the researcher's and SPCC's models. SPCC's procedures are presented in Figure 7-2.

1. Current Termination Procedures

The following steps correspond to SPCC's current termination procedures which are illustrated in Figure 7-2.

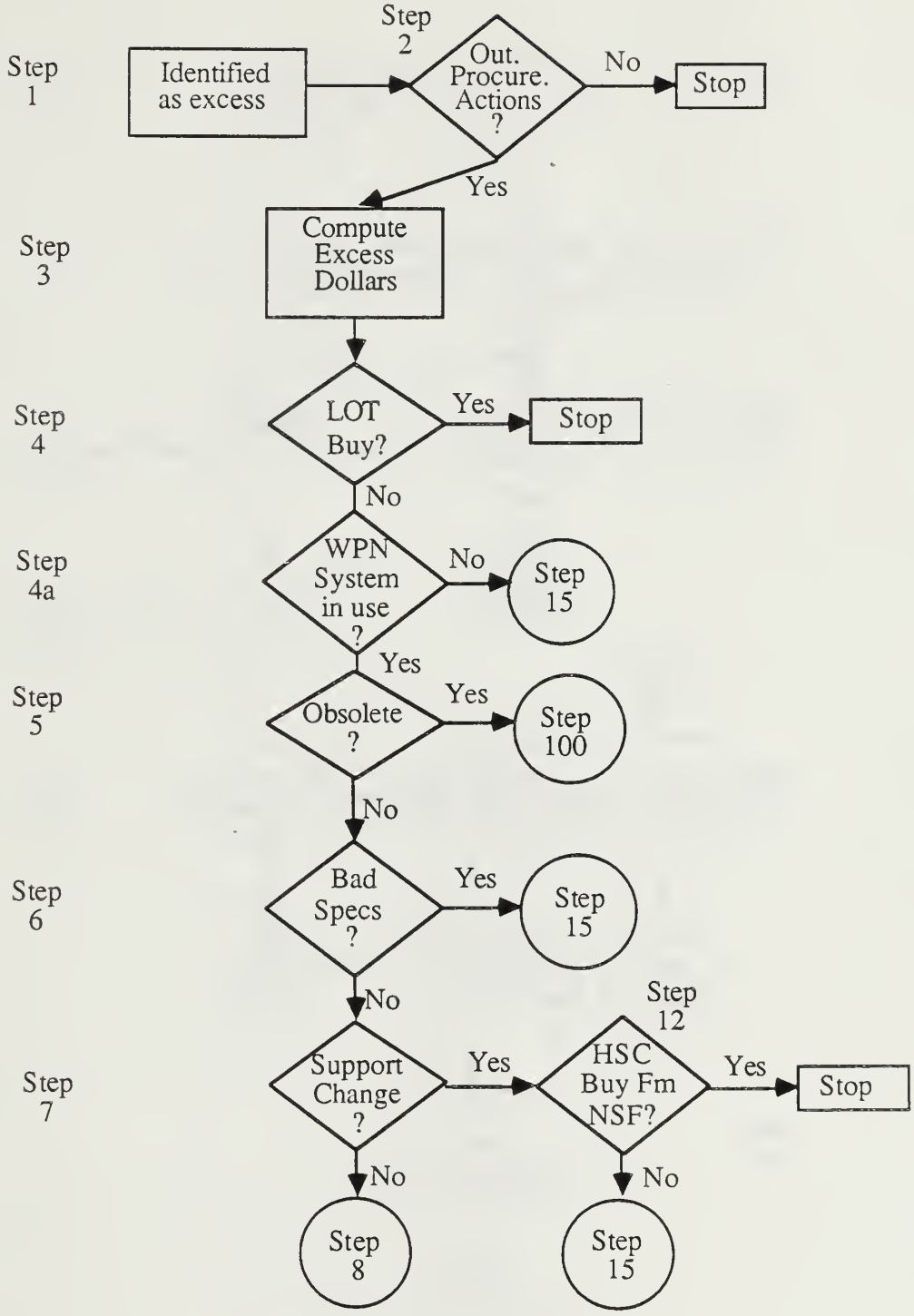


Figure 7-1a. Decision Model

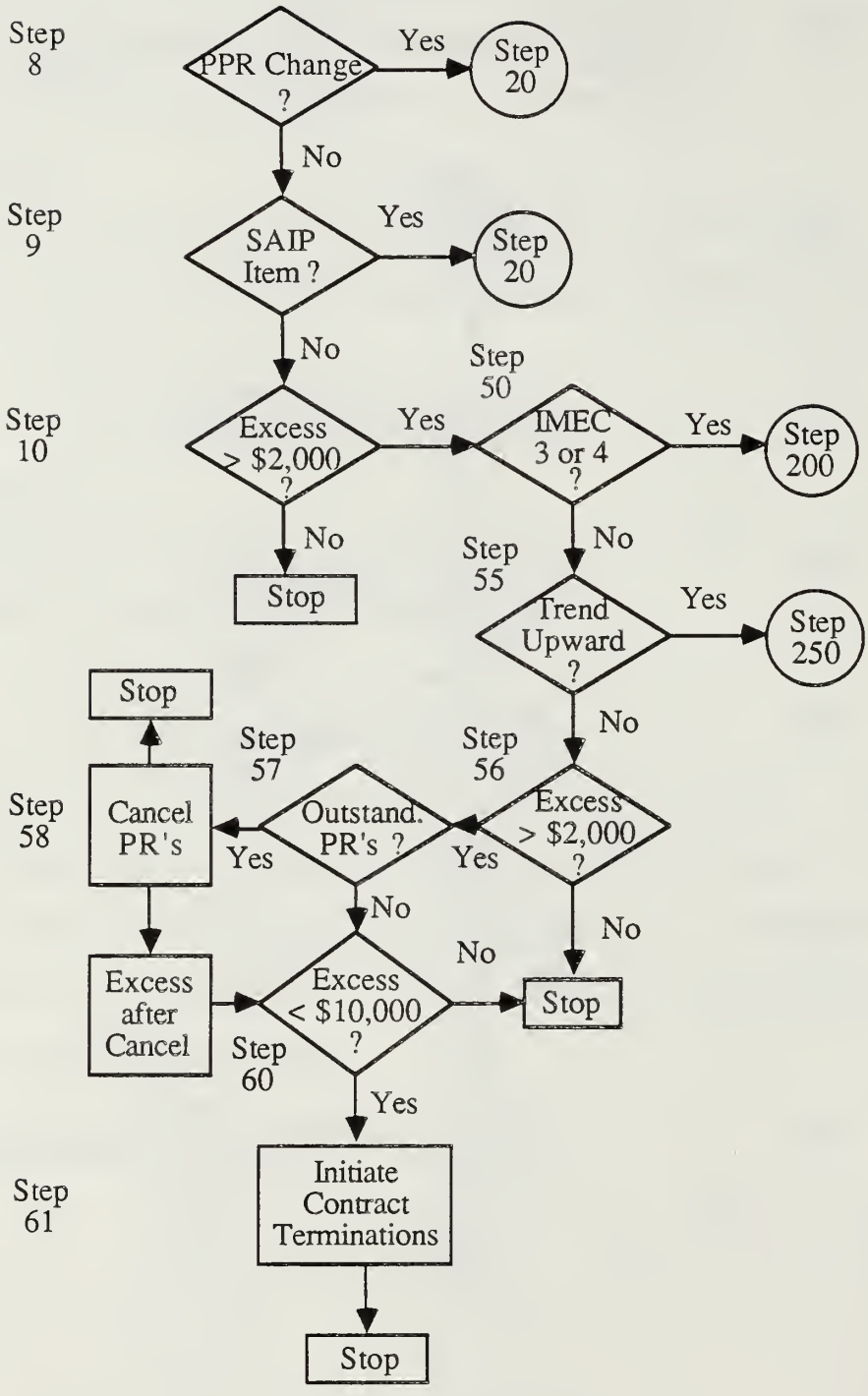


Figure 7-1b. Decision Model

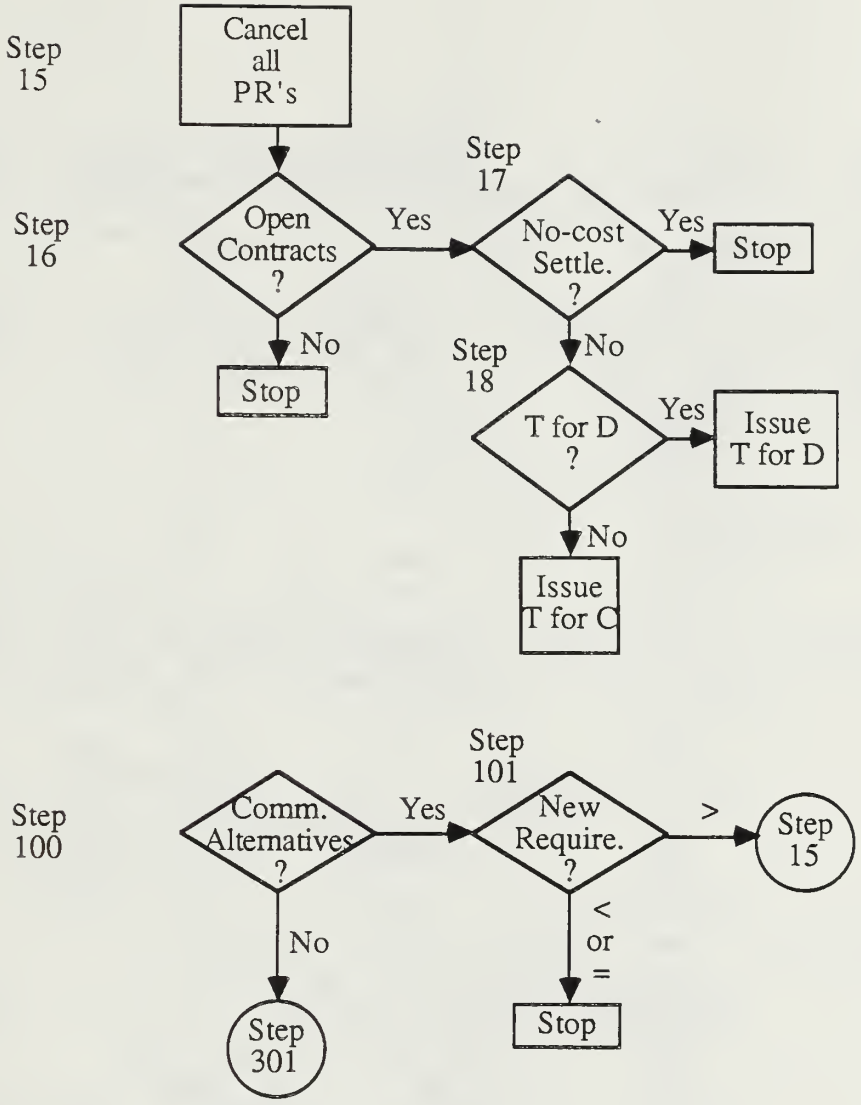
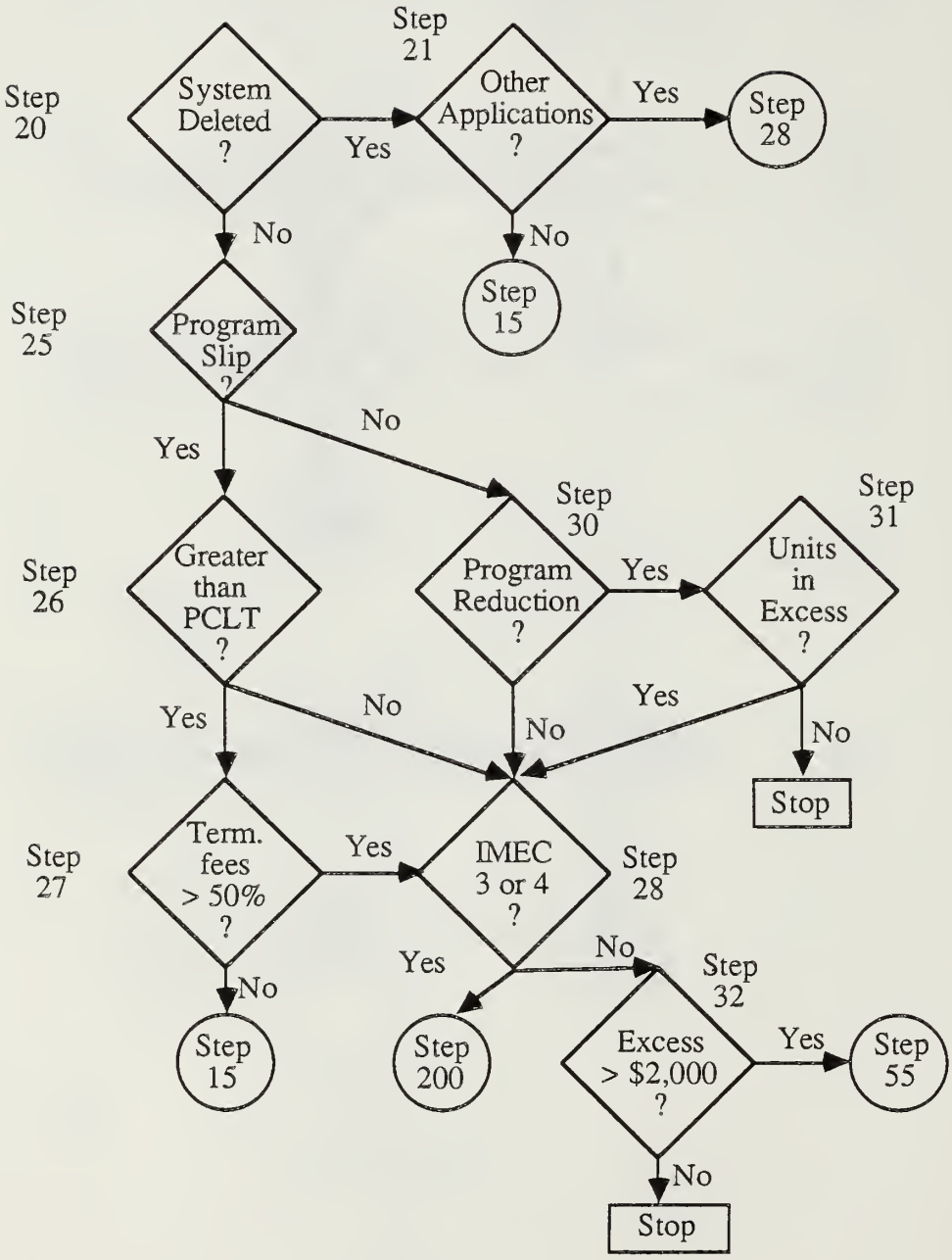


Figure 7-1c. Decision Model



Fugure 7-1d. Decision Model

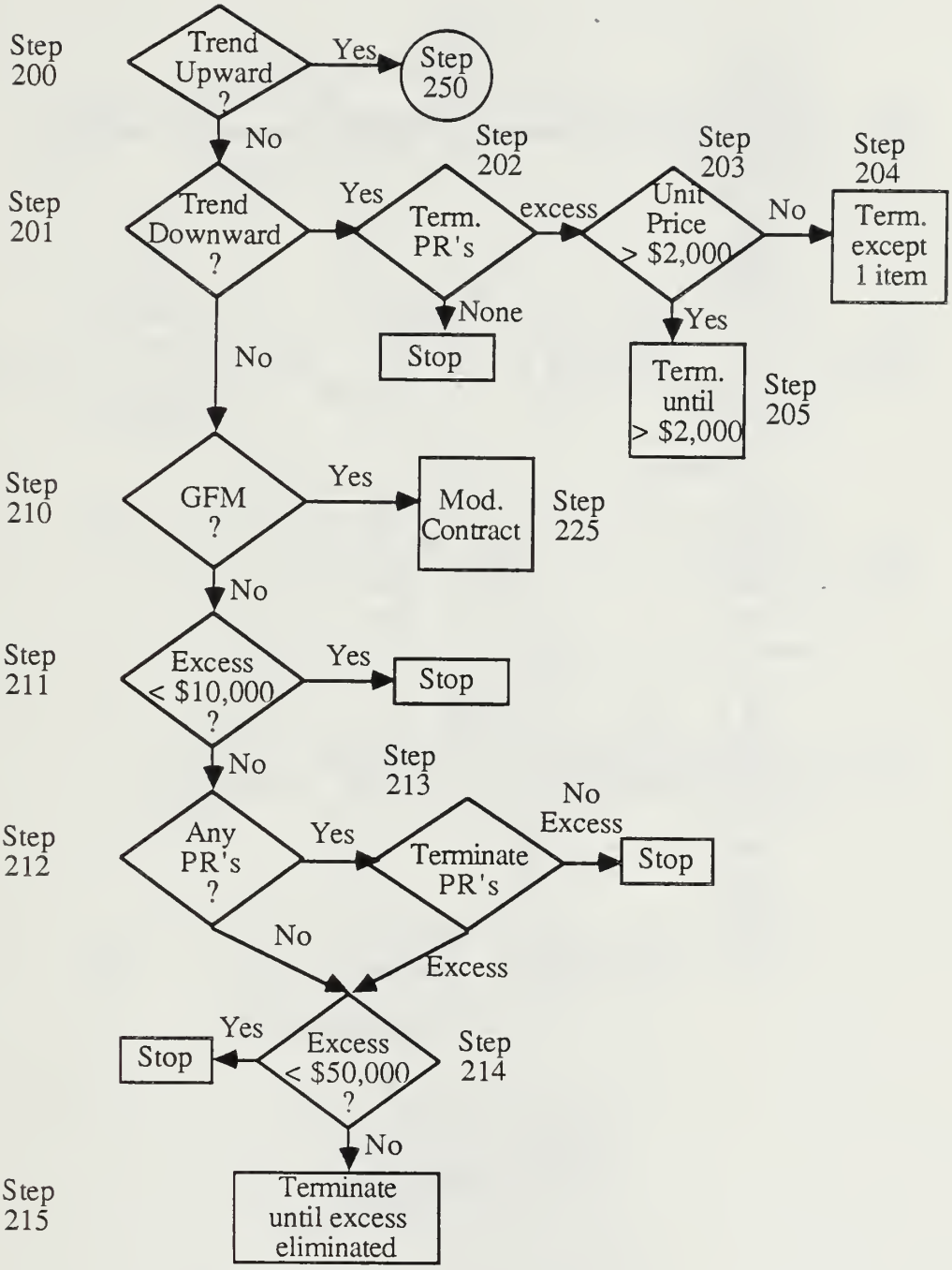


Figure 7-1e. Decision Model

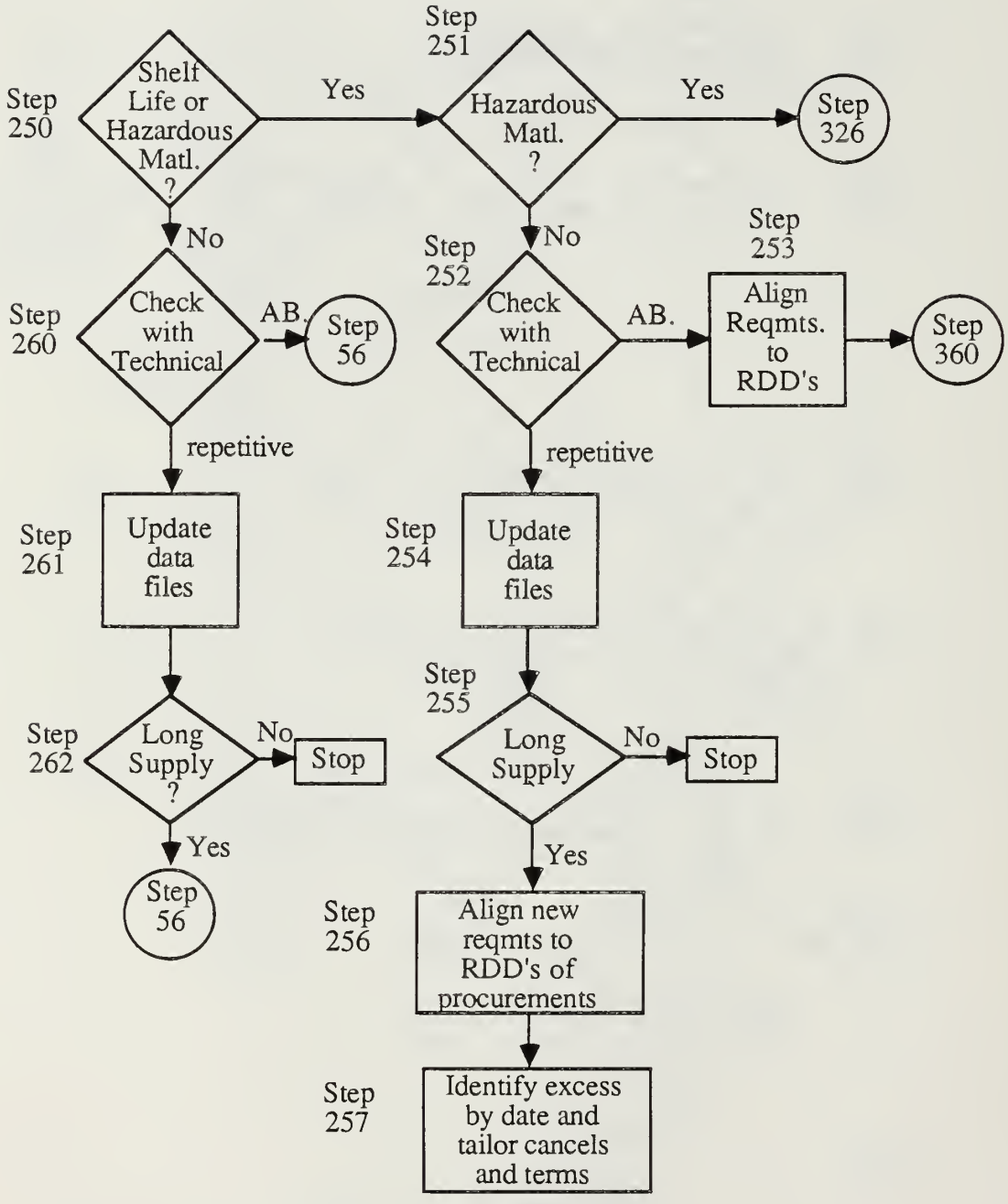


Figure 7-1f. Decision Model

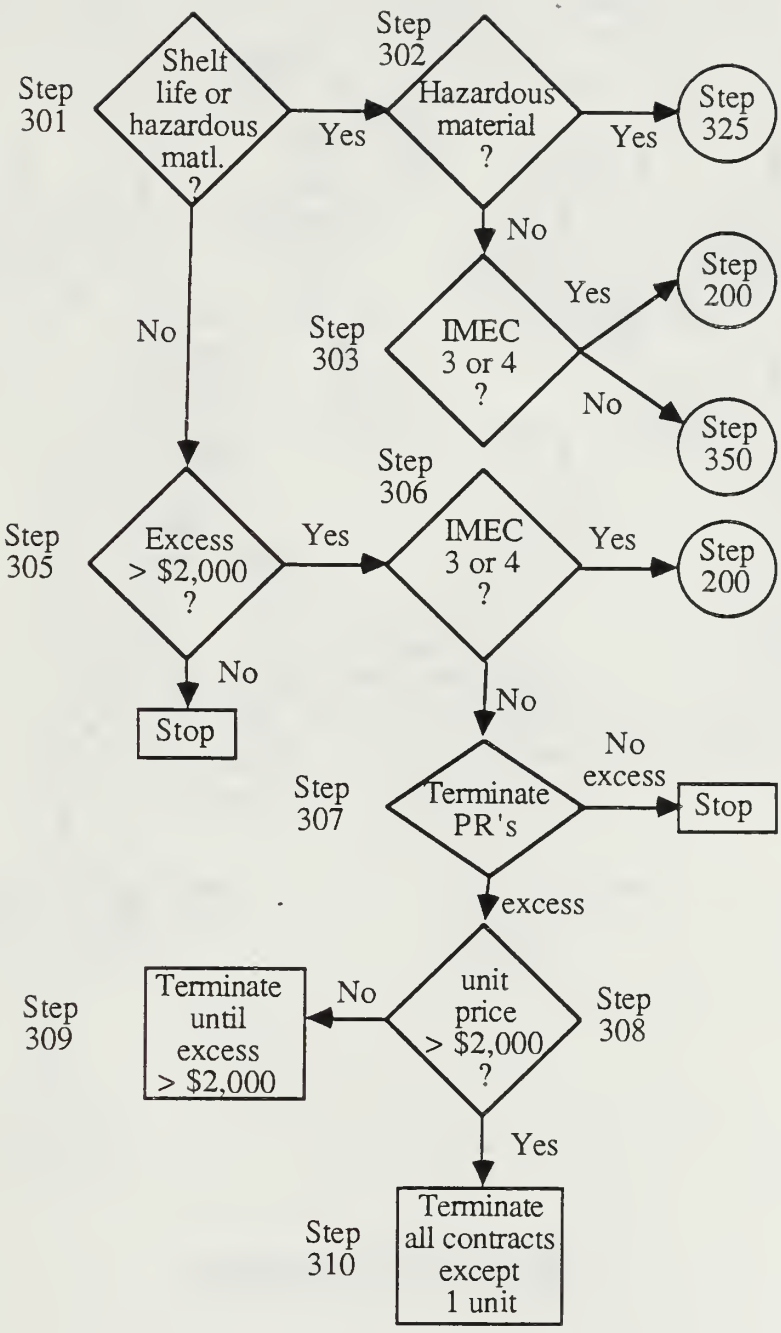


Figure 7-1g. Decision Model

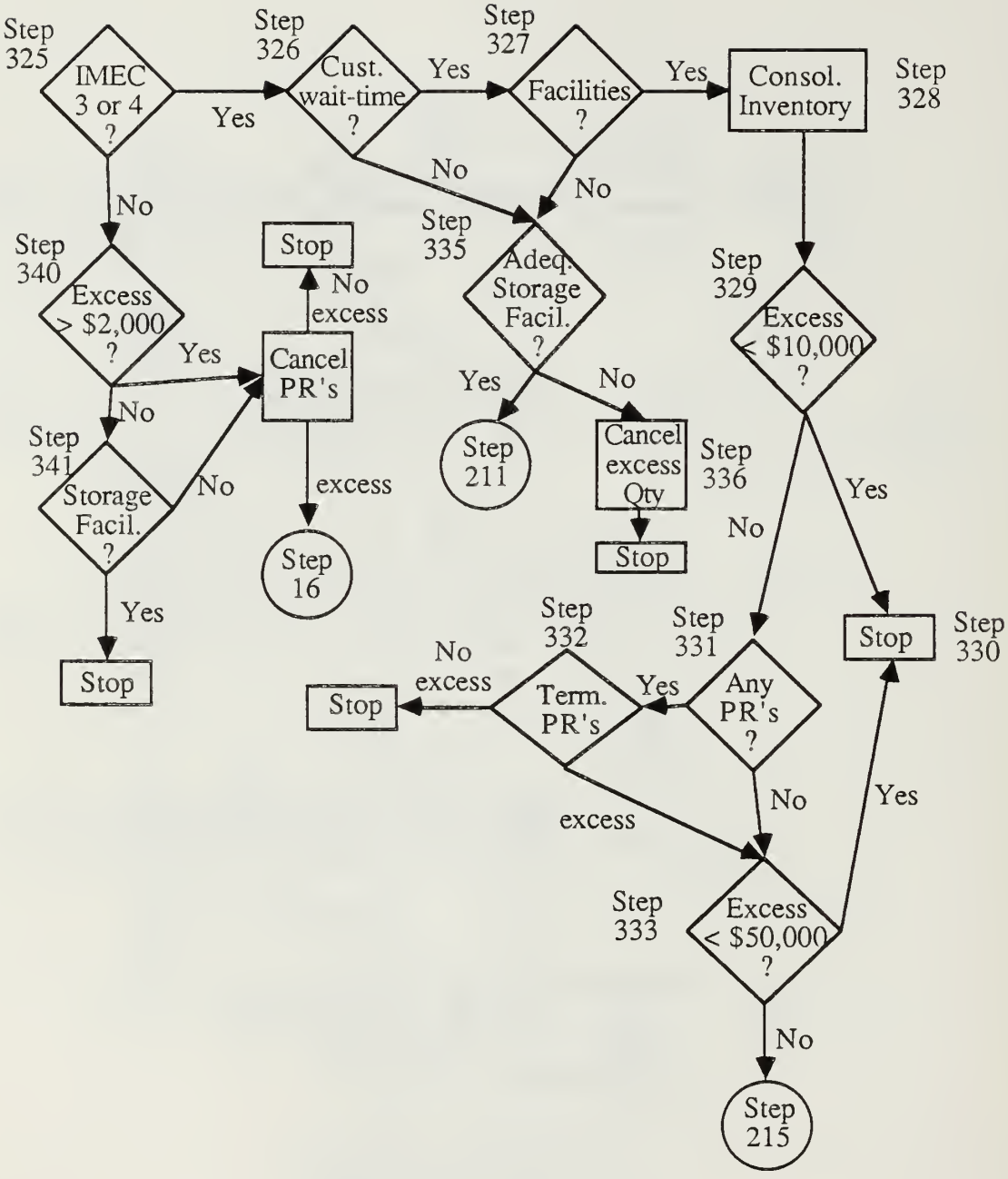


Figure 7-1h. Decision Model

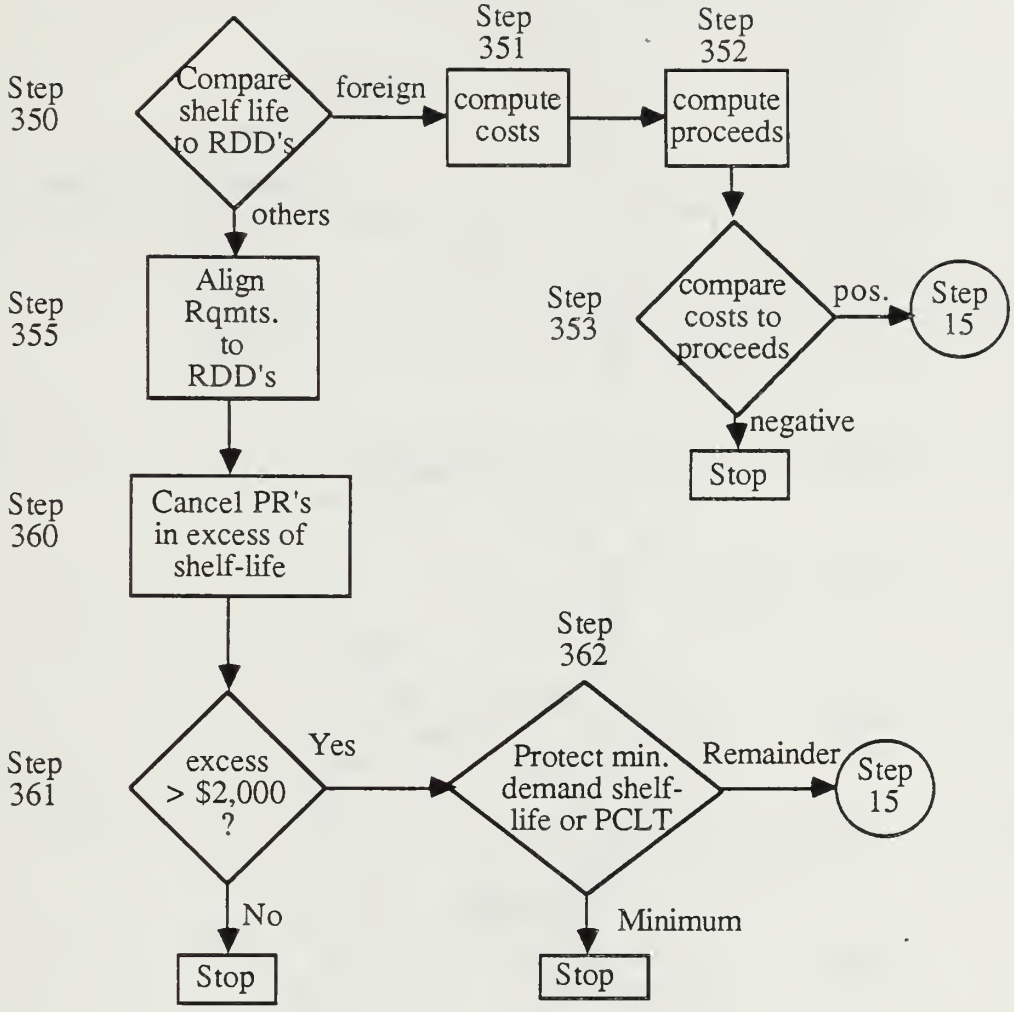


Figure 7-1i. Decision Model

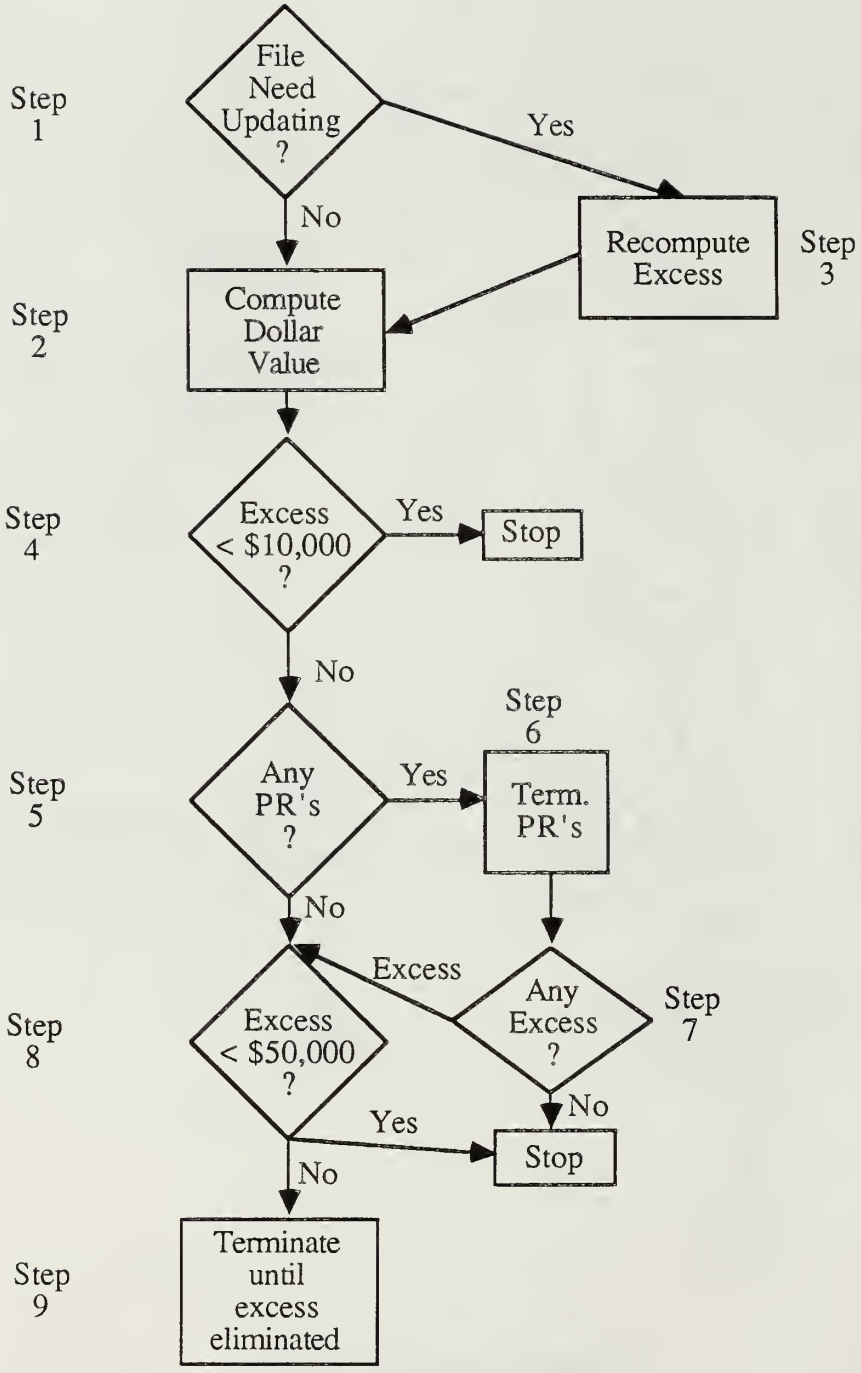


Figure 7-2. SPCC Termination Procedures Model

The full SPCC termination process is described in Appendix C of this thesis.

a. Step 1. Validate Data Element Numbers. File (MDF and Due-in/Due-out files) update required?

   -- if no, go to step 2.

   -- if yes, go to step 3.

b. Step 2. Compute the dollar value of the excess: Excess x Replacement Price. Then go to step 4.

c. Step 3. Recompute excess by manual simulation of SDR: Excess = Total Assets - Total Requirements-Economic Order Quantity (EOQ) - PPRs due within the EOQ Horizon. Then go to step 2.

d. Step 4. Is the dollar value of the excess $\leq$ $10,000?

   -- if no, go to step 5.

   -- if yes, STOP. Continue procurement actions.

e. Step 5. Are there any outstanding purchase requests?

   -- if no, go to step 8.

   -- if yes, go to step 6.

f. Step 6. Terminate purchase requests until no excess remains or all purchase requests have been terminated. Then go to step 7.

g. Step 7. Is there any excess?

   -- if no, STOP.

   -- if yes, go to step 8.

g. Step 8. Is the dollar value of the remaining excess $\leq$ $50,000?

   -- if no, go to step 9.

   -- if yes, STOP. Continue remaining procurement actions.

h. Step 9. Terminate, partially or completely, contracts until all excess is gone or until all contracts are terminated. Terminate most recently

awarded contracts first. Favor continuing contracts with small business over large business.

2. Differences between models

The current SPCC model is very short, and in most instances would probably do its task quite well. An important point, however is that exceptions to this model are never clearly written out. The researcher's model forces the IM to logically think about the reasons the item went into a long supply status. Another fault of the SPCC model is that no differentiation between IMEC codes is considered, yet items crucial to a weapon system's proper functioning are competing for funding with those items that are much less crucial. The researcher's model splits out the IMEC 3 and 4 items, as well as those items with limited shelf life or which are hazardous materials.

SPCC uses two values ($10,000 and $50,000) for decision values regarding termination in its model. Through the use of the FAR mandated $2,000 minimum level, a more thorough examination of potential termination candidates than with SPCC's $10,000 value will be achieved. Of course, if future usage of the researcher's model shows adverse affects, such as a disproportionate amount of procurement manpower being spent on this process, this value could be raised. If raised, the values should be justified in writing in order to explain these changes to future auditors. The $50,000 value

that SPCC uses appears to have been arbitrarily set, thus asking for criticism in future audits.

The researcher's model also presents a logic chart for the buyer to ensure the use of the types of terminations preferred by the FAR and case law: (1) no cost settlement, (2) termination for default, and (3) termination for convenience.

Whether an item is trending upward or downward is also considered in the researcher's model but not in SPCC's. Other applications and potential future users are also required to be considered in the researcher's model.

D. SUMMARY

By asking the hard questions up front and requiring the IM to logically think through all the possible alternatives about how the item went into a long supply status, better solutions for future procurements should be obtained. "Better" in this case means more dollars freed up, but not at a cost of readiness or SMA. Transferring this model into an expert system resident within the UICP would be the ideal methodology for the future. This would allow the program to achieve more consistency in future termination decisions, a definite step forward for the U.S. Navy.

VIII. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

In addition to the conclusions and recommendations, answers to the research questions posed in Chapter I are provided in this Chapter. The Chapter concludes with the researcher's suggestions of areas for further research.

B. CONCLUSIONS

1. Conclusion #1: U.S. Navy secondary items going into a long supply condition is not a recent phenomenon.

If secondary items going into a long supply condition had only occurred in the past few years, different recommendations and models would have required development. As stated in Chapter II, the GAO has been reporting on the long supply issue since the 1950's. This confirms the fact that larger defense budgets do not per se cause more secondary items to enter long supply status.

2. Conclusion #2: The term "long supply" does not have a universal definition.

Until all parties involved agree on a definition for long supply, the problem of secondary items in long supply will continue. During the research for this thesis, many examples were found of disagreements as to the meaning of

long supply, and of disagreements about the implications of long supply.

3. Conclusion #3: The proposed NAVSUP termination model is not as comprehensive as is required to properly identify which procurement action(s) should be terminated once a secondary item is determined to be in a long supply status.

In order for a model to accurately portray reality, and therefore be of value, the various decision processes actually used must be duplicated. As was discussed in Chapters V and VI, attempting to quantify a process which is comprised of many subjective inputs shows an inherent weakness in the NAVSUP model. The decision-making model of Chapter VII is the researcher's effort at leaving subjective values subjective, quantifying what can be quantified while simultaneously achieving a reasonable decision concerning the action to be taken on procurements of secondary items in long supply.

4. Conclusion #4: The current SPCC termination criteria does not address all areas which are crucial to properly decide which contract actions should be terminated and which should be completed.

SPCC's termination criteria are provided as Appendix C and have been discussed in Chapters VI and VII. As was pointed out in Chapter VII, when contrasted with the researcher's model, SPCC currently does not do as thorough a

review of how the item went into a long supply condition prior to deciding what action is to be taken.

5. Conclusion #5: If the draft DOD Instruction concerning termination of secondary items is implemented, SPCC should be able to quickly comply with DOD's requirements.

Due to the recent increase in both GAO and Department of Defense Inspector General audits concerning secondary items in long supply status, the researcher believes that political pressure will be applied to the Secretary of Defense to make all branches of the Services conform to a single policy. Appendix B is the version of the Draft DOD Instruction which is currently in the hands of the Services for their comments. Chapters II, VI and VII discussed current SPCC procedures which basically comply with the draft instruction, with the exception of not formally designating a "terminations coordinator." Unless further changes are made to this Instruction prior to issuance, SPCC can easily modify its current procedures to fully conform to the proposed DOD policy.

C. RECOMMENDATIONS

1. Recommendation #1: The term "long supply" should have one standard definition.

Unless agreement is reached as to exactly what "long supply" means, no solution will satisfy everyone concerned. The researcher believes that the DOD Instruction on

termination of secondary items in long supply status would be the ideal medium by which to implement this recommendation. The researcher proposes the following definition: "long supply: when assets of an item exceed all known requirements during its procurement lead time." Thus as lead time is decreased, fewer items will be allowed to be protected from termination by the IM, as should be the case. In this definition, assets and requirements are those that are listed in Chapter II for the supply demand review.

2. Recommendation #2: The researcher's decision model should be used by SPCC's Item Managers (IMs) when secondary items are determined to be in a long supply status.

The decision-making model described in Chapter VII requires IMs to follow a very structured path to determine what the appropriate action should be. By following the model to its recommendation, the maximum dollars should be recouped while maintaining item essentiality by treating IMEC 3 and 4 items differently.

3. Recommendation #3: During Resystemization at SPCC, the researcher's decision model should be programmed into the Uniform Inventory Control Program (UICP) as an on-line expert system.

By having the model in the UICP, the IM would not have to make any special effort to use the model. Data could be obtained directly from the UICP and thereby reduce both

the number and volume of items that the IM would have to manually input. By using an expert system, consistency and accuracy in determining the proper action to be taken would increase. This increase in consistency and accuracy throughout the ICP would reduce the potential for future auditor's to comment that arbitrary decisions were being made.

4. Recommendation #4: Increased accountability and traceability must be implemented by SPCC in order to reestablish both buyer and IM confidence in the termination process.

Although both buyers and IMs at SPCC are quite aware of the increased emphasis given to items in a long supply status, a mistrust of the current system exists. Today the IMs complete an SDR action form, submit it, and assume the matter is finished. As was described in Chapter II, four to six weeks passes between the time the IM submits the form and the time a DT (Due-in Termination) card is given to the appropriate buyer. The form itself is kept by the personnel in key-punching and the IM never sees the DT card. This failure to provide the actual source document raises doubts; did the personnel in key-punch accurately create a DT card for what (contract(s), or purchase request(s)) the IM wanted cancelled, and what if changes have occurred to the item's situation in the four to six week processing time period? By attaching the signed SDR action form physically to the DT

card, the buyer will know for sure that what is being requested actually is what the IM desires cancelled. The only exception to this would be drastic changes in an items demand during the four to six weeks required to process the SDR action form. In this case, the IM would need to get her supervisors assistance in contacting the appropriate team leader in the contract administration division in order to change the SDR action form. This method should only be allowed in extreme cases in order to allow the system to provide an accurate audit trail. The DT Cancellation form created by SPCC Code 025 (see Appendix D), when used in conjunction with the signed SDR action form with DT card attached, should provide the kind of accountability and traceability which is needed.

D. ANSWERS TO RESEARCH QUESTIONS

1. Subsidiary question #1: How are items determined to be in excess of requirements by Navy Ships Parts Control Center (SPCC)?

The three methods by which an item can be determined to be in excess of requirements are:

a. SDR--comparison of assets to requirements with an additional buffer stock of four or eight quarters worth of demand. The excess is that quantity of assets which exceed the requirements and the buffer stock.

b. Stratification--items reported on line B21 of the report are potential excess. If not actually on-hand, items in lines B16 through B21 of the report are DILS (due-in Long Supply) as they are the unfunded assets and therefore can be considered to be in excess. and;

c. by manual input. This occurs when the IM obtains new information about an item which either cannot be

reflected in the SDR and stratification figures or will not show up in these figures for a long time.

2. Subsidiary question #2: What is the decision-making process leading to a termination for the convenience of the Government of secondary item contracts?

SPCC currently uses the termination criteria listed in Appendix C. This method requires the dollar value of excess items to be over $10,000 to cancel purchase requests and over $50,000 to terminate contracts.

3. Subsidiary question #3: What is the potential impact of the draft DOD Instruction regarding secondary items no longer needed on the Navy's wholesale inventory operating procedures?

There will be very little impact on SPCC. A terminations coordinator will have to be formally assigned and current instructions and procedures changed to reflect this person's responsibility with regard to contract terminations.

4. Subsidiary question #4: What is the requirements process and how can it lead to the placement of contracts for items in excess of requirements?

The Navy UICP uses a modified EOQ formula to determine the optimal quantity to order in its continuous review inventory system. In Chapter II, eight reasons for contracts being placed when items are actually in excess of requirements were given. The prime factor was a breakdown in communications occurring so that the necessary information did not get to the appropriate IM in time to prevent an order from being placed.

5. Subsidiary question #5: What are the principal elements of a model which produces an optimum

decision regarding contract termination for items in excess of requirements?

As Chapters V and VII pointed out, these principal elements include:

a. investment cost;

b. holding cost;

c. ordering cost;

d. item essentiality; and,

e. the time until reprocurement must occur.

6. The primary question: **Should the U.S. Navy terminate secondary item contracts considered to be in excess of current requirements?**

This question must be answered with a "that depends." The model developed in Chapter VII forces the IM and buyer to think through each individual situation in order to decide what the correct business decision should be.

E. SUGGESTIONS FOR FURTHER RESEARCH

1. Further research should be done to compare actual items in a long supply status which were either terminated or not to see how the model would work in actual practice.

2. Further research should be conducted in implementing an expert system dealing with contract terminations, either as part of the UICP or on a stand-alone personal computer.

3. Further research should be done to adapt the researcher's decision model to repairable items.

4. Further research should be aimed at conducting sensitivity analysis of the various dollar values used in the researcher's model in order to optimize its usefulness. Measures of effectiveness might include the models effect on SMA, the dollars saved by following the model, and the actual reduction in dollars of items in a long supply status.

APPENDIX A

GLOSSARY

Administrative Lead Time (ALT). The length of time from the generation of a procurement action until a contract is awarded. [Ref. 24:p. A-1]

Diminishing Manufacturing Sources and Material Shortages (DMSMS). The loss or impending loss of manufacturers of items or supplies of items or raw material. DMSMS is caused when manufacturers of items or raw material suppliers discontinue production. Some of the reasons are as follows:
a. Rapid change in item or material technology;
b. Uneconomical production requirements;
c. Foreign source competition;
d. Federal environmental and safety requirements; or
e. Limited availability of items and raw material used in the manufacturing process.

DMSMS situations tend to have a pervasive effect that not only precludes repair of material but also precludes procurement of additional systems, equipment, spare assemblies, and subassemblies that depend on the DMSMS items and raw material for their manufacture. [Ref. 16:Encl. 2 p. 2-1]

Excess on-order spare parts. Those quantities that exceed a 4-year supply. [Ref. 14:p. 1]

Implied Shortage Cost. The assumed cost of a shortage based upon other management decisions relative to the number of days to be forecast for delay in the availability of material or the funds available for inventory levels. [Ref. 50:Encl. 1 p. 1]

Life-of-type (LOT) buy. A one-time procurement, when all cost-effective and prudent alternatives have been exhausted, for the total future requirement of an item no longer to be produced. The procurement quantity shall be based upon demand or engineering estimates of mortality sufficient to support the applicable equipment until phased out. [Ref. 16:Encl. 2 p. 2-2]

Long supply. Assets of an item in excess of all known or expected requirements during some time period, usually thought of as in excess of the Retention Limit. [Ref. 24:p. A-9] GAO uses two or more years of supply beyond current needs. [Ref. 12:p. 6] The position of having an excess quantity on-hand of an item. May require disposal action. [Ref. 25:p. B-7]

Obsolescence. The process by which an item becomes no longer technically useful. [Ref. 24:p. A-13]

Planned Program Requirements (PPRs). An anticipated requirement for material that cannot be adequately forecasted by UICP using past demand observations. These future requirements are known sufficiently ahead of the need for the material that assets can be obtained to meet the demand. Theoretically, PPRs for scheduled projects or programs are requested as nonrecurring demand by the customers. [Ref. 24:p. A-14]

Principal Items. End items and replacement assemblies whose importance requires centralized individual item management throughout the supply system, that is, at the depot level, the base level, and the using unit level. These specifically include the items for which, in the judgement of the DOD Component, there is a need for central inventory control, including: computation of requirements, procurement, direction of distribution, and knowledge and control of all assets owned by the DOD Component. Aircraft, ships, and tanks are examples of principal items. [Ref. 8:Encl. 1 p. 1]

Procurement Lead Time (PCLT). The length of time from the generation of a procurement action until the initial receipt of material from contract. The sum of PLT + ALT. [Ref. 24:p. A-14]

Production Lead Time (PLT). The length of time from procurement contract award until the initial receipt of material from contract. [Ref. 24:p. A-15]

Retention Limit. The maximum quantity of an item that is authorized to be retained within the wholesale supply system to meet future requirements. [Ref. 24:p. A-17]

Safety Level. The quantity of material which is required to be on hand to permit continued operation in the event of minor interruption of normal replenishment or unpredictable fluctuation in demand. [Ref. 50:Encl. 1 p. 2]

Secondary Items. End items, consumables, and repairable items other than principal items. [Ref. 8:Encl. 1 p. 1]

Total Variable Cost (TVC). The sum of the variable cost to order, variable cost to hold and implied shortage cost. Procurement cycles and safety levels are determined through minimization of these costs for any given group of items in an inventory. [Ref. 50:Encl. 1 pp. 1,2]

Uniform Inventory Control Program (UICP). A series of computer files and programs used by Navy Inventory Control

Points (ICPs) to manage wholesale supply system inventories. [Ref. 24:p. A-20]

Variable Cost to Hold. Those costs associated with the cost of capital, inventory losses, obsolescence, storage, and other variable costs of maintaining an inventory. Costs are considered "fixed" if they would remain constant should 50% of the workload be eliminated. [Ref. 50:Encl. 1 p. 1]

Variable Cost to Order. Those costs associated with the determination of requirements, processing of a purchase request, and subsequent contract actions through receipt of the order into the ICP system that will vary significantly in relation to the number of orders processed. Costs are considered "fixed" if they would remain constant should 50% of the workload be eliminated. [Ref. 50:Encl. 1 p. 1]

APPENDIX B

DRAFT DEPARTMENT OF DEFENSE INSTRUCTION

SUBJECT: Termination of Contracts for Secondary Items That Are No Longer Needed

References: (a) Code of Federal Regulations, Title 48, "Federal Acquisition Regulations System," Chapter 1, Part 49

A. PURPOSE

This Instruction establishes policy concerning the termination of contracts for secondary items that are no longer needed.

B. APPLICABILITY AND SCOPE

1. This Instruction applies to the Secretary of Defense (OSD), the Military Departments, the Organization of the Joint Chiefs of Staff (OJCS), and the Defense Agencies. The term "DoD Components," as used herein, refers to the Military Departments and the Defense Agencies.

2. It applies to all procurements of secondary items at the wholesale level of supply, and provides guidance to assist in determining whether contract termination is in the best interest of the Government. Specific regulatory guidance concerning actual contract termination can be found in reference (a).

C. DEFINITIONS

1. Principal Items. End items and replacement assemblies whose importance requires centralized individual item management throughout the supply system, that is, at the depot level, the base level, and the using unit level. These specifically include the items for which, in the judgement of the DoD Components, there is a need for central inventory control, including: computation of requirements, procurement, direction of distribution, and knowledge and control of all assets owned by the DoD Component. Aircraft, ships, and tanks are examples of principal items.

2. Secondary Items. End items, consumables, and repairable items other than principal items.

D. POLICY

1. It is DoD policy that when changes in missions, programmed objectives, consumption factors, authorizations, etc., significantly reduce the requirement for secondary items, consideration shall be given to reducing or terminating ongoing contracts for those items.

2. All wholesale level supply activities shall establish a terminations coordinator to manage, monitor, and audit termination actions within the activity. The terminations coordinator shall maintain appropriate records to ensure accountability of termination decisions.

E. PROCEDURES

1. The automated requirements systems of the DoD Components shall provide for the identification of unneeded assets. Thresholds shall be established at which items shall be flagged for consideration for termination. These thresholds shall be set at reasonable levels that allow the limited resources of material management and procurement organizations to be applied to those items yielding the most significant returns.

2. Every effort shall be made to cancel or reduce orders for unneeded or excess material prior to contract award. The reason for this policy is that the most opportune time to cancel or reduce orders for material that is no longer needed is before these orders are placed on contract. Relatively little cost has been incurred, and the Government is not obligated for future costs. Even if the item may be procured in the near future, little is lost by cancelling, and costs for material, transportation and storage are not incurred prematurely. Also, preaward work such as the development of technical data, packaging requirements and procurement sources may be applicable to future buys.

3. Inventory managers shall consider the reliability of requirements data, the supply position of the item, the probability of reprocurement, and the economic trade-offs involved when deciding whether to pursue termination. Contracts shall not be terminated when there is a high probability that the material shall be reprocured in the relative near future.

4. The following categories of contracts offer a potential for termination:

(a) Material on order prior to contract award.

(b) Items identified as obsolete or presenting a safety hazard.

(c) Recently awarded contracts and purchase orders.

(d) High dollar contracts.

(e) Delinquent contracts.

(f) All others.

5. The procuring contracting officer (PCO), at the request of the inventory manager, shall get estimated termination costs, if any, as soon as possible. PCOs are encouraged to make telephonic contract with the Contract Administrative Service (CAS) offices and use appropriate CAS documents such as cost proposal analyses, progress payment evaluations and delivery records whenever possible.

6. The following actions shall be considered and costed when determining whether to terminate a contract for unneeded material:

a. Terminate the excess assets on contract. Costs incurred by the contractor as well as the administrative costs of terminating the assets shall be considered.

b. Allow the contract to be completed and provide the assets as Government Furnished Material on production contracts.

c. Allow the contract to be completed, and use the assets as requirements arise. Requirements shall include security assistance requirements. Expenses associated with this action are storage costs, cost of money and value of unused assets.

7. If there is some doubt as to whether termination is reasonable, the PCO and the inventory manager shall jointly determine whether to pursue termination.

F. RESPONSIBILITIES

1. The Assistant Secretary of Defense (Production and Logistics) shall provide policy and guidance as necessary concerning the termination of contracts for secondary items that are no longer needed.

2. The Heads of DoD Components shall ensure that their Components are terminating contracts for secondary items that are no longer needed when it is appropriate to do so, and that their Components are complying with the policies of this Instruction.

G. EFFECTIVE DATE AND IMPLEMENTATION

This Instruction is effective immediately. Forward one copy of implementing documents to the Assistant Secretary of Defense (Production and Logistics) within 120 days.

APPENDIX C

TERMINATION PROCEDURES AND THRESHOLD CRITERIA

NAVY SHIPS PARTS CONTROL CENTER, MECHANICSBURG, PENNSYLVANIA

1. TERMINATION PROCEDURES FOR ITEM MANAGERS (IMs)

a. Validate Data Element Numbers (DENs) and initiate files updates as necessary upon receipt of an Supply Demand Review (SDR) termination recommendation or initiation of a manual termination.

(1) If no files updates are necessary, go to step b.

(2) If files updates are necessary, recompute the Excess by manual simulation of SDR:

Excess = Total Assets - Total Requirements - Economic Order Quantity (EOQ) - Planned Program Requirements (PPRs) due within the EOQ Horizon

b. Compute the Dollar Value of Excess:

Dollar Value of Excess = Excess X Replacement Price (DEN B055)

c. If the Dollar Value of Excess $\leq$ $10,000.00, do not terminate anything.

d. If the Dollar Value of Excess > $10,000.00, terminate as follows:

(1) If there are no Purchase Requests (PRs), go to step (2). If there are PRs, terminate them until no excess remains or until all PRs have been terminated.

(a) If no excess remains, STOP.

(b) If all PRs have been terminated, go to step (2).

(2) If the Dollar Value of Excess $\leq$ $50,000.00, STOP.

(3) If the Dollar Value of Excess > $50,000.00, initiate partial or total termination of contracts until all excess is eliminated or until all contracts have been terminated.

e. Receive information on termination costs from the buyer and compare it to the Dollar Value of the Excess to make the final decision on the termination.

NOTE: The IM decision to terminate is subject to review by management. While the IM must keep in mind the resource limitations of the buyers and the level of effort required to terminate a contract, the IM is in possession of the most complete information about the item to be terminated. Therefore, final authority for decisions on termination of both PRs and contracts rests with the IM, not the Buyer.

2. SUMMARY OF TERMINATION PROCEDURES FOR ITEM MANAGERS

Excess = Total Assets - Total Requirements - EOQ - PPRs due within EOQ Horizon

Dollar Value of Excess = Excess X Replacement Price (DEN B055)

DOLLAR VALUE OF EXCESS:	ACTION:
≤ $10,000.00	Do not terminate anything.
> $10,000.00	Terminate PRs until no excess remains or until all PRs have been terminated.

If all PRs have been terminated and the Dollar Value of Excess is ≤ $50,000.00, STOP.

If the Dollar Value of Excess is > $50,000.00, initiate partial or total termination of contracts until all excess is eliminated or until all contracts have been terminated.

3. EXAMPLES

The following examples are provided to clarify the command policy on terminations.

a. Example 1:

Value of Excess Material on Order	$ 8,000
Outstanding Purchase Requests	$ 4,000
	$15,000
	$32,000

Outstanding Contracts

Contract A		Contract B	
SUBCLIN 1	$ 3,000	SUBCLIN 1	$17,000
SUBCLIN 2	11,000	SUBCLIN 2	21,000
		SUBCLIN 3	4,000
Total	$14,000	Total	$42,000

Action to be taken: None. Total Excess is less than $10,000.00.

b. Example 2:

Value of Excess Material on Order $12,000

Outstanding Purchase Requests $ 4,000
$15,000
$32,000

Outstanding Contracts

Contract A		Contract B	
SUBCLIN 1	$ 3,000	SUBCLIN 1	$17,000
SUBCLIN 2	11,000	SUBCLIN 2	21,000
		SUBCLIN 3	4,000
Total	$14,000	Total	$42,000

Action to be taken: TERMINATE $12,000 in Purchase Requests using either full or partial termination and other considerations such as age of PR, etc.

c. Example 3:

Value of Excess Material on Order $47,000

Outstanding Purchase Requests $10,000
$21,000

Outstanding Contracts

Contract A		Contract B	
SUBCLIN 1	$ 8,000	SUBCLIN 1	$ 4,000
SUBCLIN 2	11,000	SUBCLIN 2	7,000
		SUBCLIN 3	8,000
Total	$19,000	Total	$19,000

Action to be taken: TERMINATE all Purchase Requests. Do NOT terminate any contracts.

NOTE: While this action will leave $16,000 of excess on order, it does not equal $50,000 therefore, no contract terminations are to be done.

d. Example 4:

Value of Excess Material on Order $63,000

Outstanding Purchase Requests $ 6,000
$15,000
$ 8,000

Outstanding Contracts

Contract A		Contract B	
SUBCLIN 1	$ 5,000	SUBCLIN 1	$ 9,000
SUBCLIN 2	4,000	SUBCLIN 2	21,000
SUBCLIN 3	20,000		
Total	$29,000	Total	$30,000

Action to be taken: TERMINATE all Purchase Requests. Do NOT terminate any contracts.

e. Example 5:

Value of Excess Material on Order $80,000

Outstanding Purchase Requests $ 6,000
$15,000
$ 8,000

Outstanding Contracts

Contract A		Contract B	
SUBCLIN 1	$ 5,000	SUBCLIN 1	$ 9,000
SUBCLIN 2	4,000	SUBCLIN 2	21,000
SUBCLIN 3	20,000		
Total	$29,000	Total	$30,000

Action to be taken: TERMINATE all Purchase Requests. Terminate $51,000 worth of contracts. Where possible, IMs should take all termination action against a single contract in order to reduce administrative cost and conserve buyer resources.

4. TERMINATION THRESHOLD CRITERIA

Changing demand patterns mandate active termination of PRs and contracts for material no longer required. Control and minimization of holding costs can only be accomplished by proactive management of material due-in. However, administrative costs associated with terminations require that some criteria be established to ensure terminations are accomplished in an economic and efficient manner. The threshold criteria that follow are used to prevent terminations in those cases where the potential value of the termination (in terms of price) is insignificant (in terms of cost) to terminate. The threshold criteria are to be applied except when terminating obsolete material, material with no application, material with bad buy specifications or other extenuating circumstances such as program phase-down. While total terminations are easier to accomplish, nothing in this appendix should be interpreted as requiring only total termination of PRs or contracts; partial termination is acceptable if it is the best, or only method to eliminate the excess quantity on order.

a. Automated Dollar Value Threshold for Terminations.

Certain low dollar value excesses are not economical to pursue for termination. Uniform Inventory Control Point Program (UICP) provide the capability to set a dollar value threshold for excess due-in material. Items with less than this dollar amount of excess due-in will not be considered for termination. This dollar value threshold is established by the Inventory Requirements Council (IRC) and stored in DEN V115. At the time this was printed, it was set at $10,000.00 and the examples in this appendix are based on that value.

b. Automated Dollar Value Threshold for PR Terminations.

Once it has been determined that an item has excess due-in over the threshold value established in DEN V115, PRs will be examined for possible termination. The SDR program recommends terminations for PRs by specific document number when the dollar value of the PR is above a specific threshold. This threshold, established by the IRC and stored in DEN V083, will normally be set to $0.00. This ensures that all PRs are considered for termination prior to considering any contracts for termination.

c. Automated Dollar Value Threshold for Contract SUBCLIN Terminations.

If an item remains in an excess status after all PRs have been terminated, existing contracts will also be considered for termination. SDR recommends specific contracts by

document number for termination if the dollar value of any Subordinate Contract Line Item (SUBCLIN, also called a 6-digit CLIN), is above a specified threshold. This threshold is established by the IRC and stored in DEN V084. Due to a variety of considerations, it is desirable to be able to examine all contracts for the material in question before deciding to terminate any contract, either in full or in part. Therefore, DEN V084 will normally be set to $0.00.

d. Manual Dollar Value Threshold for Contract Terminations.

As the administrative cost to cancel contracts is considerably higher than the cost to cancel a PR, this is an additional threshold and is established by the IRC. This threshold is not stored by UICP; it is implemented manually by the IM. This threshold is the total Dollar Value of Excess material AFTER all PRs have been terminated. This threshold value will be adjusted by the IRC based on resources available. At the time this was printed, it was set at $50,000.00 and the examples in this appendix are based on that value.

APPENDIX D

CONTRACT ADMINISTRATION DIVISION FORMS

NAVY SHIPS PARTS CONTROL CENTER, MECHANICSBURG, PENNSYLVANIA

A. INTRODUCTION

The following forms are in use by SPCC Code 025:

1. Long Supply Cancellation request message

From: SPCC MECHANICSBURG PA

To: DCASMA

UNCLAS//N04330//

SUBJ: N00104- , ITEMS 0001AA, QTY ____ EA CANCELLATION OF

1. SUBJ KT IS IN LONG SUPPLY AND MATL NO LONGER REQ.

2. REQ ACO NOTIFY KTR AND REQ CANC WITHOUT COST OR LIABILITY TO THE GOVT. IF ABLE TO CANC AT NO COST TO THE GOVT, THEN INFORM KTR TO DISCONTINUE ALL WORK. ADVISE _____ IF NO COST CANC IS ACCEPTABLE.

3. IF UNABLE TO CANC WITHOUT COST, HAVE KTR CONTINUE PRODN AND PROVIDE A BREAKDOWN OF ESTIMATED CANC CHARGES IN WRITING AND HAVE IND SPEC VERIFY COSTS. PROVIDE RESULTS BY _____ .

4. IF MATL SHPD ADVISE DATE AND MODE.

5. SPCC POC IS _____ , CODE ____ , A/V 430-_____ OR A/C 717-790-_____ .

2. The following form was created to control cancellation paperwork, specifically when a DT (termination) card is used:

DT CANCELLATION

Contract No:_____ Contract Date:_____

Contract Value:_____ NSN:_____

_____

Contractor/Address Phone Number

_____

Contract Administrator Code Phone Number

_____

Inventory Manager (IM) Code Phone Number

_____

IM Supervisor Code Phone Number

_____

DCASMA POC Phone Number

Date DT Card Received:_____ DT Accepted/Rejected:_____

Line item value:_____

Value of material to be cancelled:_____

Cost of Cancellation:_____

Value recovered as result of DT:_____

Weapon System material is used on:_____

When will SDR produce a new buy? _____

Is material replenishment or outfitting? _____

Contractor estimate of costs:_____

DCASMA Estimate of costs:_____

Reason for Rejection:_____

_____

Team Leader Review Division Chief Review

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